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BOVINE STREPTOCOCCUS MASTITIS AND THE PUBLIC HEALTH*

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Bovine Streptococcus Mastitis

The most prevalent kind of mastitis in cattle is a chronic catarrhal form, insidious in its onset and with a strong tendency to assume a latent course. The appearance and main properties of the streptococcus which causes this condition are well known to those who are accustomed to examine samples of udder milk. Since milk is commonly consumed in the raw state without ill-effects, this organism can certainly be regarded as non-pathogenic for human beings. Nevertheless, chronic mastitis leads to alterations in the physical properties and composition of milk, which adversely affect its quality. Also, it is objectionable that milk which contains large numbers of streptococci and the products of tissue reaction, such as blood serum and leucocytes, should be used as human food.

These facts are not without their public health interest, but during the last 20 years the problem has become more complicated by the discovery that mastitis in the cow may be caused by streptococci which are not only different from those ordinarily present but are indistinguishable from streptococci which may cause disease in human beings. It is with this aspect of the problem that this article is mainly concerned.

Milk-borne Streptococcus Infections in Man

Symptoms.—These infections have been diagnosed in accordance with their clinical symptoms as scarlet fever or septic sore throat. In the latter case, the changes in the throat may be accompanied by high fever and there is swelling of the cervical glands which may persist for several weeks, usually without suppuration. Complications such as otitis media, arthritis, pneumonia or septicæmia have also been observed.

Incidence.—Epidemics arising from contaminated milk have been recorded, especially in this country and in the United States, and there is reason to believe that a number of small outbreaks, particularly of sore throat, have passed unrecorded. A large proportion of these epidemics have occurred during the winter or early spring, the season at which sore throat is most prevalent among the population at large. An account of some 20 outbreaks which have been reported in Great Britain since 1875 is given by Savage (1912). Interest in these unfortunate occurrences was revived in this country by the somewhat extensive outbreak of septic sore throat which appeared in Brighton during the winter of 1929-30.

In the United States there was a widespread outbreak of septic sore throat, involving at least 1,400 persons, in Boston in 1911. In a second outbreak, which occurred in Chicago during the winter of 1911-12 and lasted for five or six weeks, more than 10,000 persons were affected. Figures compiled by Armstrong and Parran (1927) show that in the United States between 1908 and 1926 there were 42 outbreaks of septic sore throat involving 21,045 persons with 139 deaths, and 40 outbreaks of scarlet fever involving 3,939 persons with 20 deaths. These figures may be compared with those given for outbreaks of milk-borne typhoid, which in the same period numbered 479 with 14,968 persons affected and 219 deaths. In all these instances, according to Armstrong and Parran, the figures given for case and mortality incidence are to be regarded as under-estimates.

Bacteriology.—From some of the patients in the Chicago outbreak of 1911, Davis (1912) cultivated a hæmolytic streptococcus, to which the name *Streptococcus epidemicus* was afterwards applied. Two of the most striking characteristics of this organism are the presence of capsules and the production of large watery colonies on the surface of moist blood agar. It is agreed that this organism, which has been isolated since 1912 from a number of cases of sore throat, is closely related to the hæmolytic streptococcus which has been commonly isolated from man under the name of *Streptococcus pyogenes*.

The scarlet fever streptococci obtained from milk-borne outbreaks are not to be distinguished in their bacteriological characters from those which cause scarlet fever in the population at large.

Characteristic features of outbreaks.—It has been remarked that in outbreaks of milk-borne

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streptococcus disease there are frequently certain features in common. Thus, the onset is explosive, a large number of people showing symptoms within a few days. Cases occur simultaneously in families and the incidence in adults tends to be higher than that in children. There is little tendency for infection to spread within the household. On enquiry, unmistakable evidence is found that the infection is milk-borne. The bulk of the cases are confined to the milk of a single dairy which often distributes only a small percentage of the total supply of the locality. Further enquiry incriminates a particular farm and has sometimes revealed a history of illness, *e.g.*, sore throat, among the milking personnel. In some outbreaks the raw milk supply has remained infective for several weeks. When the supply of raw milk is stopped or the milk is sterilised, or when a suspected cow is removed from the milking line, the outbreak ceases abruptly.

With some outbreaks there is a record of disease among the cows. This has been described as a mastitis or as an ulceration of the teats, which has sometimes been diagnosed as cowpox.

The origin of outbreaks.—During the last 20 years of the nineteenth century two strongly opposed views were held as to the origin of these epidemics. It was maintained by some that cows were subject to a constitutional disease, to which the term "bovine scarletina" was applied. One of the outstanding symptoms of this condition was said to be a vesicular eruption on the skin of the udder and teats, followed by ulceration. Others held the view that the milk was directly contaminated by human beings at the time of milking or during its subsequent handling. Savage (1911, 1912) concluded that the existence of a constitutional disease, bovine scarletina, cannot be accepted as proved, and in explanation of the facts he put forward the following hypothesis: "Whenever the cow is a source of scarlet fever or other septic disease, it is because it is acting as a carrier of organisms of human origin, often in a purely passive capacity, but sometimes associated with active but *local* disease caused by the human infecting organism." Under this hypothesis: (*a*) "The cow may be a source of human disease, not because it is constitutionally infective, but because it is acting as a carrier of human pathogenic organisms; (*b*) disease of the milk-producing organs of cows is only likely to be harmful to man when the causally associated organisms are of human origin, or when human organisms are superadded as a secondary infection." (In formulating this hypothesis, tuberculosis was, of course, excluded.)

The principles enunciated by Savage explain many of the features of these outbreaks, and they have been substantiated by investigations carried out during the last 20 years, particularly by workers in the United States; Davis and Capps (1914), Theobald Smith and Brown (1915), Krumwiede and Valentine (1915), Rosenow and Moon (1915), Rosenow and v. Hess (1917), Smillie (1917), Brown and Orcutt (1920), Jones and Little (1928).

The outstanding facts which have been established by the work of Savage, Theobald Smith and Brown, and the other investigators mentioned may be summarised as follows:—

1.—The streptococci ordinarily encountered in mastitis are non-pathogenic for human beings, and can be distinguished bacteriologically from streptococci associated with disease in man.

2.—Hæmolytic streptococci, which have been cultivated from the milk of certain cows in herds associated with epidemics, have been shown to be indistinguishable from the streptococci isolated from human patients in these epidemics.

3.—As a rule not more than one or two cows in the incriminated herd are found to be infected with these streptococci.

4.—Cows which excrete these streptococci, either suffer from a clinically recognisable mastitis or they may exhibit an enduring latent infection, in which clinical signs are not obvious.

5.—Following an initial and perhaps severe attack of mastitis in one quarter of the udder, the infection may spread to other quarters, in which the disease may appear to be comparatively mild.

6.—The excretion of streptococci in the milk may persist for weeks or even months, and the count at times may be very high, even reaching several hundred millions per c.c.

7.—For the reasons stated under "4" and "5," milk contaminated with these streptococci might easily find its way into the mixed milk of the herd, and for the reason stated under "6" the milk of even a single cow would render the mixed milk, or a portion thereof, dangerous to human beings.

8.—Some strains of hæmolytic streptococci from man are capable of infecting the cow's udder experimentally. This has been achieved by introducing *minute* amounts of broth culture into the milk sinus through the teat canal, as well as by applying cultures or discharges containing streptococci to an abraded surface at the meatus of the teat.

9.—Hæmolytic streptococci from man, added to raw milk kept at 20° C. for 48 hours, increase in numbers only slightly, whereas the common saprophytic bacteria

of milk multiply greatly under these conditions. In the case of scarlet fever streptococci, it has been shown (Jones, 1928) that in blood agar at 37° C. the growth and hæmolytic effects are definitely inhibited by milk, even when the concentration of milk in the medium is as low as 1·0 per cent.

While it is not denied that direct contamination of the milk by human beings may perhaps account for isolated cases or even small outbreaks of streptococcus disease, the history of the larger outbreaks points unmistakably to heavy and continuous contamination of the milk supply. In view of the evidence which has just been outlined, it can scarcely be doubted that such contamination can only arise from an actual infection of the cow's udder.

BOVINE MASTITIS DUE TO STREPTOCOCCUS PYOGENES FROM MAN

During the last few years attempts have been made to ascertain the frequency with which cows are infected with *Streptococcus pyogenes* (*Streptococcus epidemicus*) in the absence of human epidemics. The results of this enquiry to date are briefly as follows.

In the United States in 1925 Brown, Frost and Shaw (1926) discovered two cows on a small farm to be suffering from mastitis caused by *S. epidemicus*. Hadley, Frost, Gumm and Welsh (1930) reported that during inter-epidemic periods 20 cows with udder infection due to this organism had been located. Frost (1932), in summarising the work, states that during the previous six years some 10,000 milk samples from about 3,000 different cows, belonging to certain large milk-producing herds in Wisconsin and Illinois, were examined for hæmolytic streptococci at monthly intervals, with the result that eight cows were found to be infected with *S. epidemicus*. "One of these cows had evident mastitis when found and three others developed mastitis later. The other four cows had an extremely mild, chronic mastitis which would have been detected only by the most careful analysis through a physical examination of the milk or a bacteriological analysis." At the same time, the routine examination of samples of mastitis secretion, collected in Wisconsin [number of samples not stated], has revealed 58 additional cows belonging to 17 herds in 14 different counties in this State. The largest number of cows found to be infected in any one herd was 13.

In Germany Seelemann and Hadenfeldt (1930) found 14 cows belonging to a herd of 80 to be suffering from severe mastitis due to *S. pyogenes*. Similar organisms were isolated from the throats of two of the milkers, although there was no history of illness. These authors have recently (1932) described a further case of mastitis due to streptococci of the *S. epidemicus* group.

In Austria Diernhofer (1930) encountered a case of "chronic udder catarrh," due to a highly virulent hæmolytic streptococcus, which was recognised to be closely related to *S. pyogenes* of man.

In Great Britain, as far back as 1906, Savage isolated from two cases of mastitis and from a case of teat ulceration streptococci of high virulence for mice. These may well have belonged to the *S. pyogenes* group. J. Smith (1929) reports that he examined the udder secretion from 25 cases of clinical mastitis, from eight of which strongly hæmolytic streptococci were isolated. Four of these strains produced weak toxin, which was neutralised by scarlet fever antitoxin. Two strains were from two cows in a herd which was associated with an outbreak of tonsillitis in man. Minett and Stableforth (1931), in 13 out of 82 clinical cases of streptococcus mastitis, found strongly hæmolytic and highly virulent streptococci, which were indistinguishable bacteriologically and serologically from *S. pyogenes* of man. One of these strains produced small amounts of toxin, which was neutralised at least partially by scarlet fever antitoxin. All the cases were in hand-milked cows, most of which had recently calved. Four of these cases occurred in one herd while the remaining nine occurred in separate herds in different parts of the country. A definite history of illness among the milkers could not be obtained.

The results of recent investigations, therefore, go to show that infection of the cow's udder with hæmolytic streptococci resembling *S. pyogenes* of man is more widely distributed than has been hitherto believed. At the same time, the facts suggest that our ideas regarding the public health importance of bovine mastitis may have to be revised.

PREVENTION

Milk-borne streptococcus epidemics are not common, but their effects are serious when they occur and prevention is difficult. In a general way, their prevention calls for strict supervision of the health of the milking personnel and points to the necessity for controlling mastitis in cows. In this the educative influence of medical officers and veterinarians should achieve a good deal. Speaking more specifically, the introduction of milking machines into the larger herds is to be looked upon as a useful safeguard.

On the occurrence of an outbreak the raw milk supply should be immediately stopped, or the milk should be efficiently pasteurised. If a particular farm is suspected, immediate efforts should be made by clinical and bacteriological examination to locate the infected cow or cows. This may be done by first examining groups of

cows and finally individual cows. If these efforts are to have a chance of success, prompt and whole-hearted co-operation on the part of the owner, the medical officer and the veterinarian is essential. Throat swabs of all employees who handle milk should be examined bacteriologically, and any who have suffered from sore throat or are found to be carriers of hæmolytic streptococci should be given other duties until they are free.

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Discussion

Lieut.-Colonel H. T. Bates, President of the Yorkshire Branch of the Society of Medical Officers of Health, who opened the discussion, said that he wished first of all, to convey to Lieut.-Colonel Dixon and the members of the Yorkshire Veterinary Association, the thanks of the Yorkshire Branch of the Society of Medical Officers of Health for enabling them to be there that afternoon to listen to Dr. Minett's paper, and secondly, to convey the thanks of his own Society and himself to Doctor Minett for giving them the same opportunity. He was going to leave any criticisms, any scientific criticism, of the paper to members both of the Veterinary Society and members of the Society of Medical Officers of Health, who had had more work as regards health work and statistics, but, speaking as a general practitioner and also as a part-time Medical Officer of Health, it was very interesting as well as most instructive to listen to a paper like that, because, as a general practitioner, one was constantly coming up against the small outbreaks of disease which, in a large town, would be scoffed at if one called them epidemics, yet at the same time one did see those little outbreaks. They were not sporadic cases, they were definite collective cases, if he might put it that way. The outbreak at Brighton had been mentioned, and a friend of his who was on the Public Health Staff told him various points about that a year ago. One point he made very clear was that in that outbreak there was very great difficulty in knowing whether one was dealing with cases of scarlet fever or septic sore throat. He remembered three children, one after the other, starting with sore throats. The first one was a case of scarlet fever, the second never had any rash at all but finished up with marked endocarditis and permanent injury to the heart; the third one had a nasty-looking throat and wanted to run about. All those points, when one came to those outbreaks, did make one think as to what the difference between some of those clinical diseases really meant.

He thought Dr. Minett referred to cleanliness—the impressing upon some farmers the necessity for cleanliness. He might remember the fable of the Augean stables. If he had said mistals rather than stables it would have been more to the point.

The other point in which he was interested—he thought Dr. Minett would be the voice of one crying in the wilderness—was the milking machine. He had felt for years that if one could get—he would not say a more efficient milking machine, but one which was more fruitful—and get the farmers to use it, they would have justified their existence if they did nothing but that. He had been interested in it for years, yet he had seen milking machines installed for a year or two and then they were taken out. He was told they could not keep the milk clean. If some of them who had had more experience in public health and veterinary work could say a few more words on that subject it would, he thought, be very interesting.

Major D. S. Rabagliati expressed his thanks to Dr. Minett for coming up and giving them that most interesting address that afternoon. He might say that he was deputed to ask Dr. Minett if he would attend, and, unlike many other people when asked to do a thing, Dr. Minett never made any excuses at all. He said he would be willing to come, and, he was sure, they were all very grateful to him, both for the readiness with which he accepted their invitation and for the resultant address.

His remarks had impressed on his mind a thing which he had known for a long time, that was to say, with the Veterinary Service such as they had in the West Riding they went round day after day and examined an enormous number of cows, and yet he was sure they all felt that an enormous lot more might be done if they had a veterinary bacteriologist attached to the Department and had a man who had time to deal with the many interesting cases with which they met. They took a large number of samples from cows with suspicious udders. These were examined microscopically, and if tubercle was found that ended the matter: the cow was dealt with. If not, the majority were sent forward to the laboratory for further investigation, which meant only submission to the bacteriologist. If this was negative nothing was done. One felt that an enormous amount of knowledge could be obtained and accumulated if they could have more information of those general cases of mastitis. One knew that there was a very large number of cases of mastitis among cows.

Many were recognisable, but many were not recognisable clinically. There was a vast loss to the farmers and the community from cows giving less milk from certain quarters. It was very interesting and gratifying to hear Dr. Minett say that he did not consider the ordinary forms of chronic mastitis produced a milk which was harmful to human beings. If the milk was dirty very few, or no farmers would use it; they knew it would not do to mix it. It was satisfactory to know that that milk was not harmful for human consumption. They were faced with cases where they did not like to stop the whole milk. In some cases they were able to stop the milk from one quarter where there was suspicion and allow the other to be used. That was the common sense way of using it.

Since he had been in the West Riding they had not had, in effect, a case of acute septic sore throat or of scarlet fever attributed to milk. The only outbreak was at the famous Leeds school where there were only children sick, but perhaps the less said in those rooms about that the better. They had not been confronted with any such cases as occurred at Brighton.

The only way of dealing with such outbreaks was by perfect co-operation. If there was any outbreak in that county there would be co-operation with the Medical Officers or the veterinary surgeons, whether it was in the county or county boroughs. He could promise Dr. Minett that if he came across any such cases he would let him know; he should have the opportunity of helping them to investigate any such outbreaks.

Dr. Minett talked of the benefit of isolating cows. One knew that so many of the farms had not got a square inch within their cow shed where they could isolate a cow when it was infected; it was extremely difficult to put a cow away from her neighbours. That was one of the difficulties which one was up against in dealing with small farms. A great deal of mastitis might be prevented if the farmers would isolate their cows and take all the precautions necessary to prevent spread.

The private veterinary practitioner did a great deal in helping the farmer to prevent such outbreaks, but where there was no possibility of isolation it was very difficult to take adequate measures.

Dr. J. J. Buchan observed that Dr. Minett illustrated in his paper the very close co-operation which must exist between the veterinary and human branches of the profession. It was not sufficiently realised by the public that in the protection of their own health they must at the same time protect the health of those animals which were so responsible for the food of the county—the bovines. Continuously, as Medical Officers of Health, they referred to the enormous value of milk. Many Medical Officers of Health were found so far short of ideals as to advocate, because of the impossibility of being quite assured in respect to milk, pasteurisation. One saw large communities trying to promote a general pasteurisation of milk. Personally he had already indicated his own feeling on that matter. He thought that if they went in for that, they were, from the public health point of view, going to lose a great deal. We had to maintain, if at all possible, the purest, natural and raw supply of milk to the community in order to preserve its health, but it had to be worked alongside the fact that the milk that had to be distributed to the community had to be from healthy cows, and prepared under healthy conditions. That could only be done by securing the very fullest veterinary supervision of the cows, and of the production of the milk in all its phases. He was sure that the feeling in Yorkshire had grown from year to year that that kind of co-operation was absolutely essential from the point of view of public health. He did not think, in spite of Dr. Minett, that it was sound public policy in cases of septic throat to call in those individuals, and so stop it. He wanted to see a time when he could say that all our cows were under such veterinary supervision that there was no danger to the community from septic sore throat arising from disease of the udder in cows. Failing that end, it was proper that they should have joint co-operation for the investigation of disease and the stopping of the outbreak when it arose. They had to move quite definitely for a better veterinary supervision of cattle in the prevention of human disease: a very much fuller inspection of cattle than had ever been carried out in the past. From the human point of view, he regarded it as being much more important and much more essential than a lot of the actual medical inspection of school children that took place.

Dr. J. J. Jervis commented that the subject before them was one in which Medical Officers of Health were extremely interested, because it touched so vitally the health of the community. He was interested to hear of the extraordinary prevalence of mastitis amongst the milk herds of the country.

He had had one or two experiences of outbreaks, and the one which he had most in mind was an outbreak of scarlet fever which was traced, as far as they were able to discover the origin, to the bovine. In that case, as was the case in all outbreaks of scarlet fever of bovine origin, the onset was very sudden. It was restricted to a particular milk supply. It affected children more than adults, and that was one of the points that he noted and about which he would like to ask Dr. Minett a question, because he thought Dr. Minett said it was usually adults who were most affected in outbreaks of sore throat resulting from the drinking of defective milk. One would think, of course, in so much as it was children who were the greatest consumers of milk, that it would always be amongst the younger section of the community that those outbreaks would occur. That, at any rate, had been his experience.

He would like to cross swords with his friend Major Rabagliati, who had said that there was no need to isolate the cow if one quarter of the udder was affected, but that it was sufficient if the milk from that quarter was excluded from the mixed milk of the herd, the milk from the other three quarters being allowed to go forward in the ordinary way for distribution and consumption. Surely, if that were so, one could never be sure how soon another quarter might become affected. If a cow was being milked with an infected quarter one could not be sure that the milk itself would not become affected sooner or later with the disease spreading from another quarter. It would appear to him that the obvious way to deal with a cow of that sort was to isolate it, and exclude the whole of the milk until such time as the disease had subsided.

Mr. Rabagliati had mentioned that it was very essential that every precaution should be taken to prevent the spread of infection of this sort through a milk herd. He (the speaker) was quite certain that he was likely to fail in attaining his object if he allowed an affected cow to remain in the herd, whether or not the milk from that cow was taken from the three healthy quarters. He should say that in that case the time to take precautions was as soon as one quarter showed definite signs of new effective disease.

His friend, Dr. Buchan, was, of course, a well-known antagonist of pasteurisation. He too was

up to a few years ago, but force of circumstances drove him into the other camp, and he was in that other camp still. He quite agreed with Dr. Buchan that if we could have a Utopia it would be a very nice thing to have all milk consumed in this country in a raw state, but it did seem to him that we were very far from that ideal state of affairs. In some of our large cities veterinary inspection had been carried to a high degree of perfection one might say for a very long time, and yet, notwithstanding, they did find carelessness among the producers. They found them, every now and then, falling from grace, and, as the result of that fall, the milk became contaminated and, before they knew where they were, something which was derogatory to the public health had occurred. If he could be assured that the farming community were imbued with the same feelings as they were in that room, and as Dr. Buchan inevitably was, he would at once condemn pasteurisation whole-heartedly, but after more than fifty years of public life, during which, in season and out of season, he had tried to induce the producers of milk to produce clean milk for its own sake, and to realise the importance to themselves and to the community, as a whole, of milk to which no exception could be taken at any time under any circumstances, he was afraid that many of the producers still paid a good deal of lip service only to the question of the production of clean milk. Surely it was their business, as Medical Officers, as those in charge of the health of the community, to see that the community had, in the first instance, a safe supply of milk. He realised that milk must be consumed: they would like to see more of it consumed —far too little milk was consumed in this country at the present time—but if they were going to increase the consumption the first thing they must do was to restore the confidence of people in that wonderful and valuable commodity in which confidence had been lost—he would not say for what reason. That confidence would only be restored when they could place before the milk-drinking public a safe article, a pure article. He would deprecate very strongly the introduction of the heating of milk as a means of rendering it safe if he felt that it was in any way going to reduce its food value, but it had been proved over and over again that that was not the case; if they were convinced of the truth of that statement, then surely they could go forward with their advocacy of the pasteurisation of milk with a clear conscience. He, for one, was living for the day when there would no longer be a need to pasteurise milk but when they could say openly and confidently to the public that the milk which was being produced and delivered at their doors was such that it could be consumed without any fear in its raw state; but, as he had said, they had not arrived at that time yet.

He had enjoyed the paper immensely and he desired to assure Dr. Minett that if ever they did have another outbreak of sore throat in that city resulting from the imperfect milk produced in the county, then they should immediately call upon him—but he knew that under the direction of Mr. Rabagliati it might be a long time before he would be so called upon. (Applause).

Dr. Buchan informed Dr. Jervis that he was not thinking of Leeds but rather of Manchester: in Manchester they were doing something of that kind.

Mr. J. O. Powley said that it might not be within the knowledge of all the Medical Officers of Health in this country that we get a summer mastitis, which occurred in the form of an epidemic. In the big majority of cases one was struck with the number of maiden heifers affected. It usually attacked cattle running out to pasture. He was wondering whether Dr. Minett could tell them whether that kind of mastitis belonged to the coli group or the agalactiæ groups. He was mixed up in an outbreak in Herefordshire, when they could do nothing: treatment was null and void. He believed that in some parts of the country in summer this form of mastitis was an absolute scourge. He would be interested to know if Dr. Minett had had the opportunity of investigating any of those cases, and, if so, what was the type of organism in those outbreaks.

The Chairman (Lieut.-Colonel J. A. Dixon, President of the Yorkshire Division, N.V.M.A.) said that he was particularly struck with Dr. Minett's statement regarding the extent of the prevalence of the streptococcus, and his reminder that it might be present in a cow's udder and yet fail to give any evidence of its presence. That probably explained some of the otherwise rather difficult cases of the outbreaks of sub-acute mastitis in milking cows, and more particularly in young milkers. The practically unobservable type of mastitis set up added one more to their difficulties as veterinary inspectors charged with the inspection of cows.

It was comforting to know that these particular organisms were not dangerous to public health. As they were reminded by the lecturer, it would be unpleasant to think of that milk and pus being consumed, and it probably provided the reason why he found one man, a certified milk producer, taking action. He (Col. Dixon) was purely a visitor. The man was a machine milker producing certified milk, and he had devised a small vessel with a sieve top. Before the milking machine was applied to the cows this fine sieve was examined, and if the tiniest clot of material was found on the sieve that cow was returned to the owner and suitably dealt with. He thought it more important that precautions should be taken when machine milking was employed. The hand milker, if he was an efficient man and knew his business, would be liable to spot that condition. With machine milking, where the machine was put on and the cow was not cleansed for milking it would be quite easy for one of those cows to be contributing to the milk supply, unknown to the public and the owner. It was an alarming situation to think that so many cows in the country housed the streptococcus, but for the comfort of many Medical Officers of Health he should like to say that in that part of the country, at any rate, the condition was recognised. When symptoms were observable the farmers themselves picked it out and they recognised immediately that those cows were dangerous, and they set them aside—they were not part of the milking herd. They found that, in spite of the difficulty of isolation which had been so well emphasised by Mr. Rabagliati, these milk producers discovered some place in which to put these cows, and they were put out of the way. In some cases they were reported under the Tuberculosis Order. The farmers were now better educated on that point.

Dr. Minett's remarks on the difficulty of ascertaining the outbreak of some bovine diseases recalled to his mind an incident of which his friend Dr. Spottiswood Cameron never failed to tell, of the difficulty of finding the source of infection. They were confronted with a clear outbreak. It was traced to a retail purveyor of milk, but they could not get it further despite the fact that various people tried to elucidate it. No-one on the farm was suffering from scarlet fever.

Dr. Cameron investigated and thoroughly examined all the persons engaged in milking. They met a little boy coming into the yard and asked "How is the baby?" "Oh she is getting better very nicely," was the reply. They immediately went to the boy's home and found the little sister in the stages of scarlet fever. That proved to be the true solution of the mystery.

Colonel H. G. Bowes, who said that he was neither a bacteriologist nor an inspector, observed that, as a practitioner, he was interested in mastitis and the various bovine diseases with which he met. One point in discussion between Major Rabagliati and Dr. Jervis was one that was always of interest to him, and perhaps Dr. Minett could give them some information on it: the question was whether, when a cow had mastitis in one part of the udder, the rest was likely to contain a higher number of streptococci.

He had seen a great deal of summer mastitis in Yorkshire. This was a form of mastitis met with in lying-off cows, and sometimes in maiden heifers, while very often one got it in cows in milk. He had an idea, which probably was not right, that the infection in those cows was very often conveyed by flies. Cows affected with summer mastitis were found standing in a bit of shelter, under the shelter of trees; hundreds of flies buzzed round and settled on the teats, on which there was a little moisture. Perhaps Dr. Minett could tell them whether there was something in that idea of the source of infection. The point that to his mind was of most interest and importance was the question as to how far the cow was responsible for the transference of those diseases, whether it was scarlet fever, infantile diarrhœa, or whatever it might be—how much of that infection emanated from the cow's udder, and how much from the fact that the cow was carrying the infection in her milk. The infection might have got into the udders or the milkers, one did not like to have the cow blamed too much, and he should like to know how far the cow was responsible and how far the responsibility rested with workers among the cows in, perhaps, handling the milk carelessly or in dirty methods, management of the cow and so on.

There was a good deal to be said for the use of the milking machine, though there was a widespread idea among practical men that it was difficult to produce clean milk from them. He did not know. They were all aware of the difficulty in regard to machines. There were a lot of pipes and parts to be disinfected. He knew of cases where they were producing milk of a low grade, and unless care was used, milking machines might be a hindrance. If used carefully, however, they might be a gain.

Dr. W. B. Hill, while saying that he had no intention of entering into any discussion as to the relative merits of pasteurised milk or otherwise, asked if Dr. Minett could give them any information on that point? Had any work been done, say physiological work, showing any connection between the streptococcus and the blood serum of any of the patients who were said to be infected by that streptococcus? They had heard several speakers express doubt as to whether the infection in an outbreak came from the cow or was put into the milk in the process of milking or through the transmission of that milk from the byre to the consumer. It seemed to him that, if there was any information showing a direct relationship between the particular kind of streptococcus isolated from the milk during a marked epidemic and tests taken serologically with the infected person, it would go a long way to clearing up what other people had doubted, whether the infection was from the cow or put into the milk.

He would like to pay his tribute to Dr. Minett for his very excellent and very instructive paper. He was sure they had all learned a very great deal from it.

Mr. George Whitehead associated himself with the other speakers in thanking Dr. Minett for his paper. He had no very great experience of mastitis, as he was not in an agricultural practice, but in a small industrial town with just the usual cow-keepers. He had been particularly interested in the remarks made by the Yorkshire V.M.A. President in connection with hand milking and machine milking. He remembered a peculiar outbreak at Batley, when the man could distribute milk at number 1 house and it would be all right, but at number 3, milk taken out of the same can would be radically wrong. The retailer was losing his milk round, and Dr. Pearce was called in, but although he examined the man's hands he found nothing. Examination of the cattle revealed they were healthy generally. They found out accidentally what was the matter. He (Mr. Whitehead) called to see a case at another place, when the owner observed "I have been telling the doctor about the "fall." That disclosed the whole secret; after sterilising, everything went well and everything had been well since.

Mr. Ballard commented that the great question was whether the cow produced this affected milk originally, or whether she was inoculated by some one. Years ago it was believed that those cases all occurred from the human subject inoculating the milk. Dr. Minett would be able to help them there.

Mr. Holland sought information about the form of septic sore throat: from Dr. Minett's expressed opinion it did not appear to be of an epidemic nature. He also desired to have a little more information about the method of entry of the streptococcus into the udder.

He had found that in a great many cases of mastitis one had a low form of vaginitis. When one came to examine the udder of a cow there did not appear to be any direct evidence as to how the affection had been set up—contrary to what one found in the case of summer mastitis, in which one had a little indication. In summer mastitis, when one came to examine the teat, one found there was soreness, and before one took hold of the teats one noted on the end a little purple spot. He had never been able to say how the infection of the udder with summer mastitis took place, and he would like Dr. Minett's opinion upon it.

In epidemics of milk infection among humans, what period of time had elapsed before the transmission of the disease to the human?

Mr. McGregor stated that he was the assistant of Mr. Rabagliati who sent the sample, mentioned by Dr. Minett, that contained *Streptococcus pyogenes*. Mr. Rabagliati sent him word and asked if there was any sickness in the family. It was a long time before, and the farmer's memory was not good. They could only tell him that there was one case of sickness—of sore throat—in the hay time, which was a long stretch of time before. The son had a sore throat eight weeks before he took the sample of milk. Would the son transmit it? If he attended the cow which had typical mastitis, could that cow have been infected eight weeks before the appearance of symptoms?

With regard to examining milk and finding streptococcus, did the essayist ever find streptococcus in milk which was tuberculous?

Mr. Pratt said that Dr. Minett had taken a great load off his mind by what he had told them of the germs that caused mastitis and which

were not injurious to human beings. When one inspected various cows one found udders that did not appear altogether normal. One might take a sample of milk, and to the naked eye it appeared quite normal, but on microscopical examination one discovered that it contained some pus. That was a form that the milker would very rarely observe: they never examined the udder particularly to see if it was all right, and unless there was something very radically wrong they went on milking, and all the milk went out to the public. He thought ignorance was responsible for a great deal of the harm that was done by milk: when there were complaints of anything being wrong with the milk and the matter was investigated, it was found that something had been left undone by the farmer or in the handling of the milk. A great deal could be done, by more instruction in a friendly manner, with the producers of milk. Producers did not wish to sell anything but what was correct, sound and wholesome, and in his view, now that the cattle were being inspected more and more, they could do a very great deal in instructing producers how to produce clean milk and in showing them the injury that might result from their failure to take every precaution. He came across a very good method of making a clean milker the other day. A farmer's wife complained that the milker would not wash his hands: he would milk with wet hands. He had only one cow to milk, and determining to make this lad a clean milker, she gave him nothing else to drink but the dirty milk he produced. Eventually he became a very clean milker. (Hear, hear.)

THE REPLY

Dr. Minett, in the course of his reply to the discussion, said that Colonel Bates had referred to the difficulties of the physician in some outbreaks in deciding whether cases should be classed as septic sore throat or as scarlet fever. He had also emphasised the collective importance of little outbreaks. It was generally admitted that there had been many small outbreaks of streptococcus disease which had not been reported in the literature, and it might well be that some of these were in fact milk-borne.

Dr. Minett was pleased to hear from Major Rabagliati, Dr. Jervis and others that an opportunity would be afforded for further inquiry into milk-borne streptococcus disease in man, should such an occasion unhappily arise. Already Major Rabagliati and Mr. McGregor had provided the Institute with samples of mastitis secretion, and from one of these it had been possible to isolate a strain of *S. pyogenes*. In connection with this case, it was apparent from Mr. McGregor's remarks that one of the milkers had suffered from sore throat eight weeks previously. It had been observed that patients who had suffered from an attack of sore throat might remain carriers for a number of weeks. A possible explanation would, therefore, be that this man had infected the cow in the course of milking at some period during his carrier state and not necessarily at the time of his attack. Dr. Minett did not desire to stress the matter unduly, but, in reply to Mr. Ballard and Mr. Holland, the evidence as to the *immediate* responsibility of the cow in a number of the larger recorded epidemics was clear. The *original* source was, of course, a human one. In isolated cases and in some smaller epidemics, as in milk-borne typhoid fever, the possibility of direct contamination of the milk by human beings was not denied. With regard to the experience of Dr. Jervis, that children were the main sufferers in these outbreaks, this might be expected. Actually, however, the reports in the literature indicated that in outbreaks among the general population, *i.e.*, apart from children's institutions, adults were more commonly affected than children. The reason for this was not clear, unless it was simply that milk given to children was usually heated, while most of that taken by adults was consumed in the raw state.

In reply to Dr. B. Hill, it had been definitely proved in certain instances by bacteriological and serological methods that the streptococci from cases of milk-borne scarlet fever and septic sore throat were indistinguishable from the streptococci which had been isolated from the milk of certain cows associated with outbreaks.

They had listened to an interesting discussion by Drs. Buchan and Jervis on pasteurisation. So far as streptococcus outbreaks were concerned, it was necessary in the matter of prevention to do something immediately. In small outbreaks it was not difficult to stop the entire milk supply, but in large outbreaks the only immediate remedy appeared to be efficient pasteurisation.

The Chairman and others had referred to the wide prevalence of mastitis among cattle and to the losses due to this cause. As Colonel Dixon had reminded them, the existence of latent infections greatly increased the difficulties of veterinary inspectors. At the same time, unless latent infections were taken into account, mastitis could not be controlled by the only system at present available, *viz.*, separate milking of infected cows. Speaking generally, the detection of latent cases involved the use of laboratory methods. This, then, was another illustration of the point made by Mr. Rabagliati that clinicians and laboratory people should keep in touch with one another. Co-operation was also desirable, as both Mr. Rabagliati and Dr. Buchan had mentioned, between medical officers and veterinarians engaged in public health work, and in endeavouring to prevent or control the epidemics they were discussing such co-operation was essential.

Several speakers, including Colonel Bowes, had asked whether, in the case of a cow clinically affected in one quarter, the milk of the other apparently normal quarters was fit for use. Under present conditions, there were no solid grounds for excluding the milk from such presumably normal quarters, so long as it appeared to be wholesome. Short of a proper laboratory examination, however, it might be impossible to say whether the other three quarters of such an animal were really healthy, though it was a fact that with some cows infection was confined to a single quarter for long periods. It was, of course, satisfactory to know that the streptococci ordinarily associated with mastitis were not dangerous to human health. While that was so, Dr. Minett did not think the point should be unduly emphasised, because milk from such infected cows was definitely of inferior quality.

Mr. Holland had enquired as to the method of infection in streptococcus mastitis. It was usually considered that the organisms entered by way of the teat canal. Some doubt had been cast upon that simple explanation, because experimentally it was often very difficult to set up the disease by milking cows repeatedly with hands wetted with streptococcus milk.

Several speakers had raised the question of milking machines. It had been proved over and over again that it was possible to produce clean milk with milking machines, but it was essential for more than one reason that they should be properly handled. So far as the spread of mastitis was concerned, machines had come in for some adverse criticism. He did not believe that this criticism was altogether justified. It had

been stated that following the introduction of milking machines into herds there had been outbreaks of mastitis, an observation which rather naturally suggested that the machines had spread the disease. It was far more probable that prior to the introduction of the machine these herds contained a number of latent cases of chronic streptococcus mastitis and that the altered conditions of milking for the time being rendered many of these cases clinically apparent. The proper procedure was to have the cows in the herd examined for mastitis before the machine was fitted. Infected cows could then be removed and milked by hand. Where milking machines were already in use, the fore milk of each cow should be occasionally examined.

A connection between vaginitis in cows and mastitis had been suggested, but this had not been established.

Mr. Powley and other speakers on the veterinary side had described certain features of the so-called summer mastitis of cattle. The causal organism of this condition was not a streptococcus but an organism known as *Bact. pyogenes*. This organism not only produced mastitis, but was commonly associated with other suppurative conditions in cattle and swine. Infection sometimes occurred in quite young animals and it, therefore, seemed possible that conditions in adults, such as pyogenes mastitis, might have been acquired in early life. This did not rule out the idea that *Bact. pyogenes* infection might spread among adults, *e.g.*, through the agency of flies.

FOOT-AND-MOUTH DISEASE

Danger from Wrappers Round Foreign Meat

The Ministry of Agriculture has ascertained that it is the practice at the present time to use cloth in which meat has been wrapped when imported into this country from abroad for the purpose of manufacture into bags in which foodstuffs for animals, fertilisers, and horticultural produce are packed and distributed. Many millions of these imported meat wrappers are used annually for that purpose. The Ministry is advised that in the event of the meat so wrapped being that of an animal which was affected with foot-and-mouth disease it is possible for the infection to be retained by the wrapper after being made into bags and for the disease to be conveyed by this means to the farm where the bag is delivered. The waste from horticultural produce often finds its way to the swill tub and if infected by the bags will be the means of infecting animals. In these circumstances the Minister of Agriculture considers it necessary that steps should be taken to prevent the use of meat wrappers for the making of bags which will be used for containing any of the above-mentioned products.

With this object the Minister has made an Order, which will come into operation on November 1st, entitled "The Importation of Meat, &c. (Wrapping Materials), Order of 1932," requiring meat and offals imported from an infected country to be wrapped in wrappers of a prescribed pattern so as to be readily recognisable and prohibiting the use of bags or other receptacles made from material of that pattern for the purpose of the packing, carrying, or selling in Great Britain of feeding stuffs for animals, fertilizers, horticultural produce, or material intended for use as bedding for animals (including straw, sawdust, peat-moss, or other litter). The Order also prohibits the feeding to animals, or use as bedding for animals, of any feeding stuffs or materials which have been packed or contained in bags or receptacles wholly or partly made from material of the prescribed pattern.

Clinical Communications

TUBERCULOSIS IN THE HORSE

J. G. WRIGHT and J. H. N. HOBDAY,
Royal Veterinary College, London

Subject.—An 8-year-old bay gelding, the property of the L.M.S. Railway Company.

We are indebted to Mr. W. N. Thompson, M.R.C.V.S., for the opportunity of seeing this animal and for the following history of the case.

History.—The animal was purchased as a five-year-old in October, 1929, and worked satisfactorily on the streets of London until December 18th, 1931. At no time did it carry much flesh, but the only abnormality noticed was that it went "wide behind."

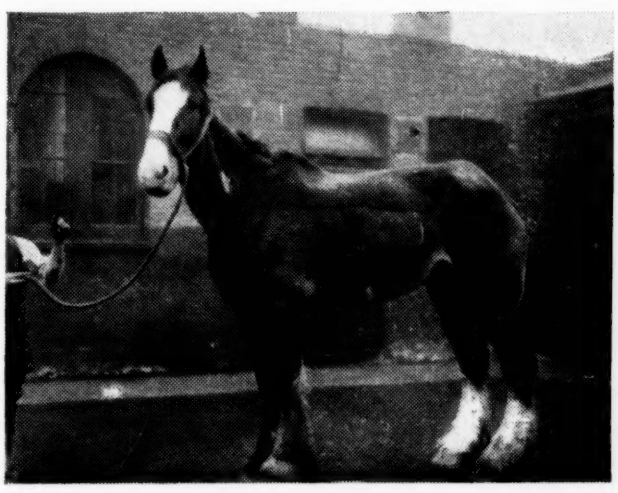
On December 18th, 1931, it contracted equine influenza, but recovered and returned to work on December 31st.

On January 11th, 1932, it was noticed that the animal was losing condition and that it was stiff in the hind limbs, particularly when first brought out in the morning.

On January 28th it was again brought to Mr. Thompson's notice. In addition to the debility a marked stiffness of the neck was now observable. The case became progressively worse, and on February 5th, Mr. Thompson having diagnosed tuberculosis, the case was handed over to us for demonstration to students.

Examination.—Considerable emaciation, marked stiffness of the cervical vertebral column with a noticeable atrophy of the neck muscles. The animal was unable to lower its head to drink, although appetite was good. There was some locomotor incoördination of the hind limbs, particularly if the animal was moved suddenly.

Temperature 99·8° F. Pulse 50. Respirations 12. The spleen could not be palpated *per rectum*. Fæcal examination revealed strongyle and ascarid eggs.



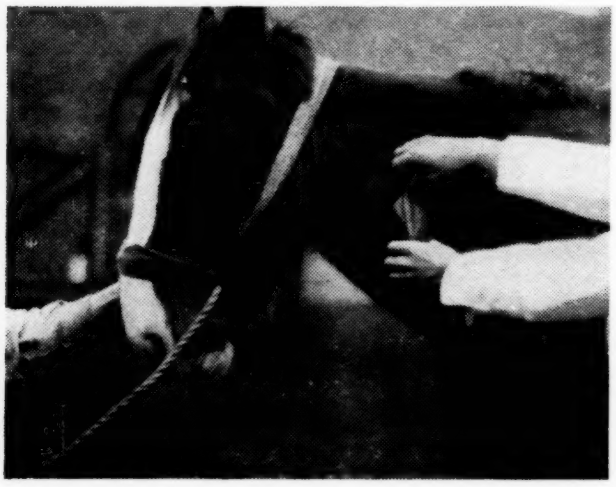
Double intradermal test, February 6th, 1932.

Concentrated tuberculin (R.V.C., Pathology Department).

Skin fold before injection	...	4 mm.
„ „ after injection	...	7 „
„ „ 24 hours later	...	20 „
„ „ 48 „ „	...	12 „
„ „ Second injection	...	16 „
„ „ 72 hours later	...	18 „

Tender and œdematous.

Reaction considered positive.



Ophthalmic test.—A few drops of concentrated tuberculin was instilled into the left conjunctival sac.

At the end of 24 hours there was a muco-purulent discharge, the size of a pea, at the inner canthus.

A second injection was made at the end of 48 hours, but this did not provoke further reaction.

Subcutaneous test, April 10th, 1932.

8 c.cs. dilute tuberculin injected subcutaneously in the neck.

Temperature at time of injection	...	101·6° F.
„ „ 9th hour ...	...	101·4° F.
„ „ 12th hour	...	101·8° F.
„ „ 15th hour	...	102·1° F.
„ „ 17th hour	...	101·2° F.
„ „ 19th hour	...	101·6° F.

No reaction.

None of the tests gave rise to malaise.

On February 13th the abdominal cavity was tapped, with a view to obtaining material for microscopical and biological examination, without success.

In view of the uncertainty to which the subcutaneous test had given rise, it was decided again to inject concentrated tuberculin intradermally in two places.

A.—Fold after injection	...	7 mm.
„ after 2 hours	...	20 „
„ „ 24 „	...	21 „
B.—Fold after injection	...	6 „
„ after 2 hours	...	12 „
„ „ 24 „	...	15 „

In each case the swelling was painful on pressure.

The animal was destroyed (Greener Killer) and *post-mortem* examination carried out by Professor Hare, whose report follows:—

"The carcass revealed a mild degree of generalised emaciation. There was a primary tuberculous osteomyelitis of the body of the 4th cervical vertebra, resulting in the formation of a tubular abscess containing about 10·0 c.cs. of greenish-yellow-coloured cream-like pus, of which dried smears revealed abundant A.A.F.B. The abscess extended from the inferior aspect of the 3rd intervertebral disc upwards and backwards on to either lateral surface of the 4th cervical vertebra and was surrounded by granulation tissue which penetrated deeply in the surrounding muscles. The granulation tissue also extended to the lip of the foramen of the 4th right cervical root, whence a slight hyperæmia of the dura mater extended for about 3·0 cms. The spinal cord and nerve roots were not involved.

"No macroscopic abnormality was found in the cervical lymphatic glands. There was a secondary spreading miliary tuberculosis confined to the apex of the right lung. The oldest caseating tuberculous lesions were grouped around the main bronchus to the apex, whence the tuberculous process had spread (1) outwards to the periphery, producing a localised chronic adherent tuberculous pleurisy; (2) inwards towards the root of the lung as an advancing tuberculous pneumonia; and (3) into the wall of the main bronchus, producing an early tuberculous bronchitis. No macroscopic abnormality was found in the remainder of the lung or pleuræ, or in the other organs of the body."

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JOHNE'S DISEASE IN A JERSEY COW

J. G. WRIGHT and J. H. N. HOBDAY,
Royal Veterinary College, London

Subject.—A 4-year-old Jersey cow. Last calving March, 1931, second calf. Mated September, 1931. Pregnant.

History.—Illness was first noticed in August, the chief symptoms being occasional tympany of the rumen, grinding of the teeth, appetite variable, and alternating periods of constipation and diarrhœa. A progressive, but not rapid loss of flesh.

On December 22nd the animal was admitted to the College. The attendant was strongly of the opinion that the case was one of foreign body in the reticulum, as two cows had already died on the farm in question from this cause.

Examination.—Pulse 68, no abnormality in the heart being detected. Temperature 102°. Respirations normal. Bright, appetite fair, weight 6-cwt. 33-lbs.

During the first week the cow was under observation the appetite was poor; there was a

complete absence of cudding, and profuse diarrhœa.

Intradermal Johnin Test, January 5th, 1932. (Johnin prepared by Major Dunkin in February, 1929.)

Fold before injection	... ...	6 mm.
„ after injection	... ...	8 „
„ „ 24 hours	... ...	10 „
„ „ 48 hours	... ...	10 „
„ „ second injection	...	10 „
„ „ 72 hours	... ...	10 „

Fold insensitive to pressure, no œdema.

No reaction.

Intestinal astringents and bitters were prescribed and the animal rapidly picked up. Appetite and cud became normal and its weight on discharge one month later was 7-cwt. 28-lbs. —an increase of 107-lbs.

February 28th, 1932.—The animal was again admitted to the College, symptoms of inappetence and diarrhœa having returned.

Examination.—Pulse 60. Temperature 101·6°. Respirations normal. Profuse diarrhœa. The animal was eating and cudding long hay but refusing all concentrated food. During the next few days careful attention was paid to the heart rate and sounds, and the temperature, but as these remained normal the suggestion that the case was one of traumatic gastritis was discarded.

Intradermal Tests carried out simultaneously on February 29th, 1932.

A. Johnin.

	1.—(Johnin—Major Dunkin as before.)	2.—(Johnin—Dr. Sheather: 1 month old.)
Fold before injection ...	6 mm.	6 mm.
Fold after injection ...	8 „ (insensitive)	8 mm.
Fold 24 hours later ...	9 „ „	9 „
Fold 48 hours later ...	9 „ „	9 „
Fold 48 hours after second injection ...	11 „ „	9 „
Fold 72 hours later ...	11 „ „	9 „
No reaction.		

B. Tuberculin.

	1.—(Bovine.)	2.—(Avian.)
Fold after 1st injection ...	8 mm. (slightly painful)	8 mm.
Fold 24 hours later ...	12 „ „ „	12 „
Fold 48 hours later ...	11 „ „ „	11 „
Fold 48 hours after 2nd injection ...	12 „ „ „	12 „
Fold 72 hours later ...	12 „ „ „	11 „

These were considered negative reactions.

Fæcal Examination.—Negative for acid-fast organisms, negative for ova.

The case, from a clinical aspect, being typical of Johne's disease, it was decided to adopt the treatment recommended some years ago by Sir John M'Fadyean, *viz.*, dilute sulphuric acid and ferrous sulphate.

Under this the animal at first improved, the diarrhœa lessened and there was an increase in body weight of 12-lbs. in 11 days. Progress, however, was not maintained..

Subcutaneous Tuberculin Test, March 22nd, 1932. Temperature before injection, 4 c.cs.

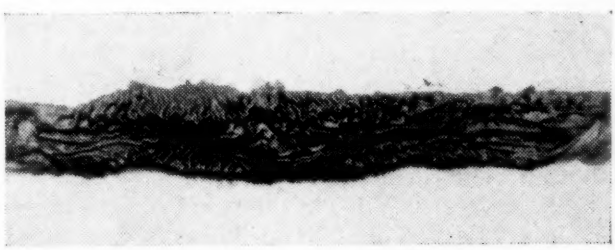
dilute tuberculin (R.V.C.)...	...	101·8° F.
„ 9th hour	... ...	101·4° F.
„ 12th hour	... ...	102° F.
„ 15th hour	... ...	100·4° F.
„ 18th hour	... ...	101° F.

From this point the animal became steadily worse, its weight on March 21st being 5-cwt. 98-lbs., a loss of 154-lbs. in two months, and so it was destroyed on March 24th.

Post-mortem examination was carried out by Dr. Hare, who reported:—

"The gravid uterus was healthy and contained a well-developed fœtus between the seventh and eighth month of growth.

"About five feet of the distal part of the ileum revealed typical lesions of an early paratuberculous enteritis (Johne's disease). Direct smears made from scrapings of the mucosa of the affected part revealed A.A.F.B. in small numbers, occasional bacteria being found within large mononuclear phagocytes. The large intestine contained diarrhœic fæces with gas bubbles. No macroscopic abnormality was found in the mesenteric lymphatic glands. No other abnormality was found throughout the carcass. The brain was not examined."



An invitation to that effect having been received by the Dartmoor Pony Society, the breed will be represented by a group of ponies at the Milan International Show next year for the first time. It is announced that the entry of Dartmoor ponies for the forthcoming Devon County Show is the largest for many years.

* * * * *

A revival in heavy horse breeding was indicated at the annual spring show of Clydesdales at Penrith. The parade of horses for stud purposes was larger than usual, and quality in the competitve class of yearlings was considered the best for some years.

SOME INTERESTING EQUINE CASES

D. A. GILLMOR (MAJOR, R.A.V.C.),
Military Veterinary Hospital, Sialkot, Punjab

Case I.

A brown, Australian mare, while undergoing her remount training, was asked to jump some obstacles. At one of these she fell and got away from her pilot. When free she galloped towards the regimental lines which are separated from the parade ground by a tar macadam road with a deep drain or nullah on either side. The second was her undoing. In some way not well known she slipped up and fractured the complete upper row of carpal bones in her off knee into small fragments. The semilunar was the only one at all recognisable.

I counted twenty-five separate pieces but made no attempt to collect all the splinters which were attached to ligaments and the surrounding tissues. It appeared strange under the circumstances that the radius and metacarpus were completely intact.

Case II.

Grey Australian gelding, eight years. The scene was similar to the above but in this case the instructor, not being satisfied with the exhibition given by the recruits, proposed to demonstrate how the jumps should be negotiated. At one of the smaller jumps the horse made a slight mistake and got no further.

Post-mortem examination verified the diagnosis and revealed fracture of the olecranon process of the near ulna into four pieces. The instructor, I understand, also suffered from fracture of the elbow but met with a different fate.

The foregoing accidents occurred within a few days of one another and were immediately followed by two other cases which seem worthy of record.

Case III.

A Bay Australian mare, six years old, was admitted to hospital on January 11th, 1932, with a temperature of 104° F. and not inclined to feed. As the days progressed the temperature showed remissions and exacerbations but no organisms were visible in the blood smears taken at intervals. The patient became emaciated although never completely off her feed.

On February 24th colicky symptoms were in evidence, but these passed over on the administration of chloral hydras. Twenty-four hours later she dropped dead.

Post-mortem examination revealed about one foot of the ileum firmly adherent to the abdominal wall, surrounded by acute localised peritonitis, and a large abscess discharging pus into the abdominal cavity. The wall of the abdomen was much thickened and numerous sinuses were found, but none of these penetrated the tunica abdominalis. In one of the sinuses a piece of thin wire about three inches long was found. It appeared strange that this should have reached so far without causing trouble.

Case IV.

An Australian gelding, 17 years old, recommended for casting at an early date as old and worn out, was sent to squadron riding drill. Without showing previous signs of distress he dropped dead after crossing a small jump.

Post-mortem examination disclosed the following:—

The intestines and all abdominal organs were normal except the liver and spleen.

Liver:—enlarged, with innumerable cirrhotic areas, none of which were larger than a pin's head.

Spleen:—enlarged, but of normal consistence.

Thoracic Cavity:—the lungs were intensely congested, with numerous small hæmorrhages into the substance and under the pleura.

The heart appeared much larger than normal, with excess fluid in the pericardium. On opening the left side nothing abnormal was seen, but on examination of the right side two hæmorrhages under the endocardium were observed. One was in the auricle and the other in the ventricle. There were a few small hæmorrhages into the myocardium.

VETERINARY INSPECTION IN EAST SUSSEX

At a meeting of the East Sussex Agricultural Committee, held at Lewes on April 28th, the appointment of two whole-time veterinary inspectors by the Diseases of Animals Acts Sub-Committee was approved. The inspectors appointed were Mr. D. Johnston, M.R.C.V.S., of Woking, at a salary of £500 per annum, together with travelling and personal expenses of £175 per annum, with headquarters in the Lewes area; and Mr. G. F. Pickering, M.R.C.V.S., of Hamilton, at a salary of £400 per annum, together with travelling and personal expenses of £150 per annum, with headquarters in the Battle area.

Mr. S. Burdett-Coutts, chairman of the sub-committee, said that they hoped to effect certain economies by the appointment of whole-time inspectors, but the principal motive was to carry out more efficiently the services they had to undertake. There would be certain small economies, but a great improvement in the service.

Upon the report of the General Purposes Sub-committee it was decided that after June 1st next the veterinary inspection of herds in respect of which licences for the production of Grade "A" milk have been issued or applied for, be carried out by the whole-time veterinary inspectors, and that no charge be made for such inspections.

It was reported that at a meeting of the Diseases of Animals Acts Sub-committee, held on April 1st, a letter was received from the part-time inspectors, who offered to accept a reduction of ten per cent. from the present scale of fees. The committee had replied that they were unable to reconsider the question as the County Council had already decided upon the question of policy. It was further reported that notice had been given to the part-time inspectors to terminate their appointments on June 1st next.

Abstracts

[Pyorrhœa Alveolaris: An Analysis of some Methods of Treatment. Stones, H. H. *Brit. Dent. Jour.* liii (1932), 8, pp. 499-508.]

The increase in canine practice, which constitutes perhaps the most striking development in veterinary activity of recent years, has invested the condition of pyorrhœa with an importance that with a very occasional, if outstanding, exception, finds little reflection in either the written or spoken word of the profession. In extenuation it may be argued that this is a disease in which the doctrine that prevention is better than cure is so forcibly illustrated that its study by the veterinarian may well be subordinated to insistence upon sound methods of dog feeding, yet the needs of the growing army of victims of sloppy diet demand closer attention than the occasional application of scaler and lotion.

Dr. Stones, both in his brief survey of the local pathology of pyorrhœa and in his discussion of methods used in combating it, will most effectively disabuse the mind of any veterinary reader—and of these there should be many—who may regard the condition as meriting but summary study and treatment.

A brief synopsis is given of the various opinions held regarding the ætiology of the disease, which range from J. G. Turner's contention that it is caused only by some local dirt condition in the mouth, to May Mellanby's view (derived from experiments on puppies) that an early dietary deficient in vitamin A renders the epithelial structures prone to gingival infection in later life.

A survey of the condition of the normal gum surrounding the teeth, and its pathological appearance in pyorrhœa, prefaces consideration of the effects to be expected on these tissues from various forms of treatment in well-developed cases with pocket formation. The many remedial measures which have been advocated are reviewed under three headings: (1) General treatment; (2) specific treatment; (3) local treatment.

The advocates of the first method, though holding that pyorrhœa is due to some general disturbance, concede that, once pockets are established, local measures must supplement general treatment if the pathological changes that have taken place in the subgingival epithelium and underlying tissues are to be checked. The aim of the general treatment school is to increase the CO_2 content of the blood, thereby reducing the alkalinity of the saliva responsible (so they hold) for the deposition of tartar round the teeth.

Specific treatment has followed upon the attempts of investigators of the contents of the pockets to discover a definite causative organism. Three groups of organisms are considered in this connection, *viz.*, Amœbæ, *Spirochætæ vincentii* and fusiform bacilli, and streptococci. Concerning this aspect of the investigation the author states: "vaccines by themselves have been given to seventeen of our cases as a preliminary to other forms of treatment and before commencing local remedies. It was found that there was some slight improvement in the condition, but not as much as if the usual local measures only were adopted."

Local treatment is considered under the following headings: (*a*) Methods of cleansing the pockets and reducing the flow of pus, as by scaling and treatment by antiseptics, electrical treatment and ultra-violet ray irradiation; (*b*) Box's method; (*c*) surgical treatment.

In regard to (*a*), scaling must not be superficial; not only must the salivary tartar be removed, but the harder subgingival or serumal calculus must be scraped away thoroughly. Free drainage of the pockets is essential, and attention is directed to stopping the flow of pus that is usually seen when the disease has progressed to a certain stage; though pus may be eliminated temporarily, however, its return is inevitable, despite the use of antiseptics (the milder the better) or the practice of ionic medication or ultra-violet irradiation.

This persistent recurrence of the disease with pus discharge from the pockets, led to investigation of the possibilities of surgical interference.

Box's method aims at obliterating the pocket by obtaining re-attachment of the periodontal membrane to the cementum: "An ideal treatment," but further investigation of the method is desirable before it is possible to say that it is practicable in many cases.

There remains gingivectomy, which, as practised by the author, aims at a result which should be able to stand the test of a histological examination of the affected local tissues and a bacteriological test of the alveolar bone. To determine the actual condition of these tissues after gingivectomy experiments were carried out on dogs affected with pyorrhœa, the experiment being preceded by a systematic examination (radiological and bacteriological) of each animal as to the preliminary condition of the alveolar bone.

The pockets in one half of the jaw only, top and bottom, were cut away. Only the front teeth, including the canines, were treated. The unoperated side was thus left as a control. The dogs were killed at the following periods after the experiment: (1) Four days; (2) seven days; (3) twelve days; (4) one month; (5) three months; (6) four months; (7) six months. The detailed results given show the histological

condition of the investing tissue to be more normal, while cultures from the alveolar bone taken three to six months after gingivectomy proved sterile, despite the fact that, in dogs affected with pyorrhœa, positive cultures of a short-chained *Streptococcus viridans* have been obtained direct from this source in 62 per cent. of cases. Apart from Box's method, then, the surgical treatment of pyorrhœa in suitable cases and when the final lesion, pocket formation, is fully developed, would appear to be the only means of eliminating the disease.

The dog, however, is not so suitable a subject for gingivectomy as is man, on account of the flatness of the dog's palate and also, in the lower jaw, on account of the shallowness of the lingual side of the alveolus; moreover, in dogs the difficulties of after-treatment are almost insuperable.

Incidentally, it may be mentioned that the veterinary reader's interest in the particular (April 15th) issue of the *British Dental Journal* containing this informative contribution, will be enhanced by the inclusion therein of a masterly article on "Dental Jurisprudence" by the Secretary of our Royal College, Dr. Fred Bullock.

W. B.

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[Poisoning of Livestock by Plants that produce Hydrocyanic Acid. Couch, J. F. Dept. Agric. Leaflet No. 88, Washington, U.S.A.]

While the occurrence in the United States of a larger number than in Great Britain of species of plants capable, under certain circumstances, of developing hydrocyanic acid renders this publication of greater practical importance to the States veterinarian and agriculturist, it is of more than academic interest to the practitioner on this side. Even in the U.S.A. only a few such plants are actually dangerous under practical conditions, and of these a list is given by the author, but we have our own similar troubles in connection with the cherry laurel and common flax, while millet, or sorghum, and the maize have also been incriminated. In 1906 considerable poisoning took place from the importation of the wild *Phaseolus* from the East under the name of Java or Rangoon bean.

In dealing with the factors affecting the quantity of hydrocyanic acid in plants, Couch states that the acid develops only when normal growth has been retarded from any cause, inflicting damage which enables reaction between the contained glucoside and enzyme. In general, mature or dry (hay) cyanogenetic plants contain a smaller percentage of potential acid than the young or fresh plants, but some plants, even when dried, retain a considerable proportion of the active acid. This applies especially to seeds, and dry immature flax seed has caused hydrocyanic poisoning, while dry Rangoon beans, bitter almonds, peach kernels, and wild cherry bark contain much potential acid.

Concerning prevention, the author enlarges upon and illustrates the well-known fact that, since poisoning depends upon the presence of the actual acid, anything that prevents its development in the stomach—such as feeding alfafa, glucose, or starch-containing substances—lessens or entirely removes the danger of poisoning in animals permitted to graze in the vicinity of plants capable of developing HCN.

A brief reference to the familiar symptoms of poisoning is followed by the following informative paragraphs:—

"If the dose is sufficient to sicken an animal it is highly probable that the animal will die. Six grains (0·4 gram) of pure acid is considered a fatal dose for the average horse. Cows are somewhat less susceptible. In one experiment a cow received 6 grains of pure acid and was made very sick but recovered. The fatal dose for the average cow would be somewhat in excess of this amount. Sheep are fatally poisoned on a dose of 1 milligram per pound of weight, or about 1⅔ grains for a 100-pound sheep. A moderate-sized dog may be expected to die if given 0·04 to 0·05 gram, which is one-tenth the lethal dose for horses.

"If a plant, then, contains as little as 0·02 per cent. potential hydrocyanic acid, and if the animal consumes it all rapidly, 5 pounds of the plant would be fatal for a horse or cow and 1·25 pounds would kill a sheep, if no factors entered in to prevent the development of the acid. Under actual conditions, however, on account of interfering factors such as those already considered, those quantities will not always prove fatal. But since cyanogenetic plants may contain ten to twelve times as much potential acid as in the case just cited, it becomes evident that the fatal dose of these plants may be comparatively small and the danger to livestock correspondingly great."

No reliable clinical antidote is known, even if, as is rarely the case, time allows of the application of remedial measures. Oxidising substances, such as potassium permanganate solution, given as a drench, destroy unabsorbed hydrocyanic acid in the stomach, and hydrogen peroxide slowly combines with the acid to produce a less dangerous substance. Glucose or ordinary corn syrup, given as a drench, combines with the acid to produce a harmless substance and, furthermore, retards the development of more hydrocyanic acid. A freshly prepared suspension of ferrous hydroxide in water, made by mixing equivalent quantities of copperas and caustic soda, converts hydrocyanic acid into relatively nonpoisonous substances (ferrocyanides) and so serves as an antidote.

The fumes of ammonia breathed into the lungs may be effective both through their strong stimulating action and through the tendency of ammonia to convert the acid into less dangerous substances. Hypodermic injections of glucose, atropine, sodium sulphide, and sodium thiosulphate may be helpful if administered promptly.

W. B.

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[Bacillus Abortus Bang and its Relation to Bursitis in Cattle. (Trans-title.) Magnusson, H. 1932. *Skand. Vet.-Tidskr.* 33-49. 2 figs., 2 tables, 12 refs.]

The observation has often been made that bursitis in cattle is more frequently encountered in cattle affected with *B. abortus* (Bang). The author traces the steps by which our present knowledge of the rôle played by the bacillus in the animal organism has been obtained.

The involvement of:—

(*a*) The udder was demonstrated in 1912 by Melvin and others; (*b*) the testicle in 1913 by Barendregt; (*c*) the mammary lymph glands and pelvic ditto in 1916 by Schroeder; (*d*) inflammation of the stifle joint by Buck and Creech in 1915; (*e*) tendon sheaths of the ox after intravenous infection in 1928 by Bang and Bendixen; (*f*) the subcutaneous bursæ in 1923 by two Swedish workers, Bergman and Agren. Boyd and others (1930) were the first to isolate the *B. abortus* (Bang) from lesions of chronic bursitis.

The various types of inflamed bursæ in cattle are then dealt with.. Most commonly the front of the carpus is involved (" capped knee "); other frequent sites are the lateral aspect of the hock and stifle.

The author examined 1,250 cattle of the same type and from the same areas of country. Of these, 203 were affected with bursitis.

The agglutination titre of the blood of all cattle not affected with bursitis was ascertained; in affected cattle the titre of the blood and that of the bursal fluid were tested.

The results are set out in detail and are briefly as follows:—

Cattle not affected with bursitis: 1,055 (12 per cent.) of these gave positive blood test.

Cattle affected with bursitis: 203 (39 per cent.) of these gave positive blood test.

In the majority of cases the blood had a higher agglutination titre than the bursal fluid. On the other hand, the reverse obtained in several cases. If two bursitis lesions were present in the one individual, different agglutination values were often found for each. In 11 instances attempts at culture or inoculation into guinea-pigs proved positive for *B. abortus*. In one such case when *B. abortus* was found both on culture and guinea-pig inoculation the blood titre was only 1-50 and that of the bursal fluid 1-25.

The author reaches the following conclusions:

Bacillus abortus (Bang) has been shown to be present in the bursitis fluid in 11 instances.

In one instance of a long-standing dry bursitis with caseous foci, a strain of abortus bacilli were isolated which proved virulent when injected into a pregnant cow.

The abortus bacillus is probably not the primary cause of a bursitis. This question is fully discussed and several reasons put forward in support of the conclusion. Lesions of bursitis may, on the other hand, constitute long standing reservoirs of infection.

G. B. B.

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[Bursitis and its Relation to B. Abortus (Bang) Infection in the Horse. (Trans-title.) Magnusson, H. (1932). *Skand. Vet.-Tidskr.* 3. 95-103 1 fig., 7 refs.]

The author reviews the work of previous writers on this subject. Through Thomsen, of Denmark, he quotes a reference to observations made by Fontaine and Lütje, 1919, who noted 12 cases of fistulous withers among 17 reacting animals. This work is thus much earlier than that of Rinjard and Hilger hitherto regarded as the first contribution to this subject.

The author analyses the history, serological and bacterological findings in four cases of fistulous withers which showed agglutination reaction and in two cases yielded abortus bacilli on culture. Further conclusions are:—

(*a*) Horses can be readily infected with pure culture *via* the conjunctiva when positive agglutination tests result.

(*b*) In nine cases infected by this route no definite and localised lesion has been induced.

(*c*) The presence of *B. abortus* in lesions of fistulous withers is probably secondary to an already established bursitis depending on some other cause. This is analogous to the carpal bursitis (" capped knee ") in cattle and constitutes a similar reservoir of infection.

G. B. B.

HUNTERS' IMPROVEMENT SOCIETY

At a Council meeting of the Hunters' Improvement Society on April 19th, Major Gordon B. Foster was elected president-elect. Capt. T. L. Wickham-Boynton reported his election as chairman of the Show Committee, and submitted the financial statement of the recent show, indicating a loss of £802, as compared with £754 in 1931.

It was resolved to amend the rule applying to veterinary examination, *viz.*: " All animals in Classes 2 to 11, other than entire colts licensed under the Horse Breeding Act, 1918, will be examined, and no horse will be eligible to enter the judging ring unless it is passed sound by the Society's Veterinary Inspectors at the show. Yearlings will not be tested for their wind. Any horse operated on for wind must be considered unsound."

Report

THE MUKTESAR INSTITUTE, INDIA, 1930-1931.*

Within this slender official report there is much that is of interest to veterinary science in the statements of its small scientific staff, to whom is accessible the wealth of pathological material of the Indian sub-continent. Founded in 1893, originally as a small research station in the isolation of the Himalayan foothills, the laboratory has rapidly expanded its activities, mainly to meet the demand of the provincial veterinary departments for prophylactics to combat the serious prevailing animal plagues. Most important of these plagues is rinderpest. And the manufacture and sale of anti-rinderpest serum have been for a number of years, in a sense, the main function of the laboratory. The current expenditure during the year was about Rs. 8¼ lakhs (about £61,875) and the revenue about Rs. 12 lakhs (about £90,000). This figure for expenditure does not include a number of items, such as interest on capital, depreciation, etc., but, nevertheless, it would seem that the Institute is, so far as the Government of India is concerned, entirely self-supporting, from the sale of its manufactured products (a position to which it attained in 1925, following upon the adoption of the revised methods of manufacture still employed) and that the financial contribution of that Government towards research into the formidable cattle plagues of India, in the shape of monetary support to the central research institute of the country, is virtually nil.

The chief issues were: anti-rinderpest serum, 22,602 litres (in 5 c.c. " doses "); anti-hæmorrhagic septicæmia serum, 5,097 litres (in 15 c.c. doses); hæmorrhagic septicæmia vaccine, 1,650 litres (in 5 c.c doses); blackquarter aggressin, 999 litres (in 5 c.c. doses); anti-blackquarter serum, 934 litres (in 15 c.c. doses); anti-anthrax serum, 437 litres (in 15 c.c. doses); mallein, ordinary, 20,113 c.c. (1·0 c.c. doses); mallein, intrapalpebral, 4,023 c.c. (0·1 c.c. doses). A few other products were issued, on a comparatively minute scale. The figures for issues are given here for total bulks, as the term " doses," in reference to anti-rinderpest serum in particular, is illusory to the technical reader, for it is known that the dosage required for satisfactory passive immunisation is seldom so low, even for the naturally resistant plains breeds of cattle, as 5·0 c.c., and the doses prescribed for active immunisation, by the serum-simultaneous method, are several times this amount. " Dose " here again has hardly any strict meaning as a potency unit.

Nearly one-half of the total bulk of anti-rinderpest serum was issued for the serum-simultaneous inoculation, the chief users being Madras, Burma, Central Provinces, and the Military Department. This is perhaps the most encouraging feature in the report, for it shows that the veterinary authorities, in the face of the prejudices and other obstacles that have had steadily to be overcome, are at last seeing their way to applying the only kind of protection that has been proved to succeed in countries where stamping-out methods are impracticable. For this method of inoculation a " special " serum is issued, the difference between it and that issued as a " preventive " serum, for inoculation by the serum-alone method, apparently being that it is of higher potency, that is, derived from buffaloes during the earlier stages of " convalescence." Nevertheless, the same charge is made for the serum of low potency as for that of high potency, and the wonder is that purchasers, to get all they can for their money, do not always ask now for the " special " serum.

There was a marked falling off in the demand for most of the saleable products during the year. This is attributed to a cyclical subsidence in the epizootic prevalence of rinderpest and to the shortage of money in most of the provinces. A notable exception, however, is to be found in the products sold for inoculation against blackquarter, namely, both aggressin and serum, the demands for which seem to have shown a marked increase. While there is undoubtedly much in the Director's explanations upon the cause of the decline in demands, the information given by Mr. Cooper, in the research section of the report, upon the efficacy of serum-alone protection against rinderpest would incline the reader to suspect that there may be a further explanation. From the results of contact experiments with cattle in the laboratory, he finally states that " control of rinderpest by 'serum-alone' must at best be a very prolonged and, therefore, tedious and expensive procedure." Is it not possible that provincial veterinary workers, who have tried to control the disease on a large scale in the field by this method, have been slowly coming to the same conclusion, and that they feel it hard to persuade their governments in times of shortage to find the money to buy what they had spent on readily when they were more sanguine? Mr. Cooper is surely right in stating that his results are " a strong argument in favour of the wholesale introduction of the 'serum-simultaneous' method of immunisation of cattle in India." If, further, he could adduce convincing evidence on the subject of *cost*, the paramount factor in veterinary prophylaxis when all others, such as efficacy and safety—that would suffice in human medicine—are settled, he would

*Annual Report of the Imperial Institute of Veterinary Research, Muktesar, for the year ending March 31st, 1931 (Director, Mr. F. Ware, F.R.C.V.S.), ii+51 pp. 1931. Calcutta: Govt. of India Central Publication Branch. [Price, Re. 1.10.0 or 2s. 9d.].

have gone a long way towards achieving his goal. This statement must be somewhat modified, of course, to comply with the requirements of Indian conditions, for, as everyone who has had experience in that country knows, every problem, including particularly one that would at first sight seem strange to a Western mind, namely, the active immunisation of cattle against rinderpest, has often to be examined sympathetically in the light of its possible repercussions upon religion.

For a number of years, efforts have been made to unload the remote and costly Muktesar station of what may be called its brewery work by testing the possibilities of undertaking this work simply at a sub-station situated on the plains, near Bareilly, at Izatnagar, where materials are easily and cheaply procurable and transport facilities are readily available. These efforts have so far succeeded that the four most bulky products of the Institute, namely, rinderpest, hæmorrhagic septicæmia, and blackquarter sera, and blackquarter aggressin are manufactured entirely at this sub-station, and issues of these products direct to customers are now also made from it. The revenue estimated from the sale of these four products comes to nearly Rs. 10½ lakhs. (out of a revenue for the whole Institute, as already mentioned, of Rs. 12 lakhs). The economies in manufacturing costs are reflected by the separate statement of accounts for the sub-station, which amounted to only a little over Rs. 2½ lakhs for the year. The Muktesar station itself was, therefore, run at a current expenditure of rather more than Rs. 5½ lakhs, against a revenue of about Rs. 1½ lakhs. As the Director rightly insists, however, this does not mean that a sum of about Rs. 4 lakhs (about £30,000) was spent at Muktesar on research during the year. Some of this money was spent on the testing for potency of the products of the sub-station. It is presumed that the saleable products made at Muktesar would not be produced at a loss. On the face of these figures, it would seem that the provinces are paying for the above four products about four times the prime cost of manufacture. The Director remarks, however, that when a commercialised system of accounts for the sub-station for a whole year have been audited, proposals will be submitted to reduce the price of the products to something approaching the cost of production.

These points have been specially noted in this review because it is understood that what is hampering considerably the progress of the provincial veterinary departments is the strain imposed upon their budgets by the expenditure on sera and vaccines from Muktesar. In times of prevailing financial stringency, this strain may well render impotent the proper functioning of the departments, for the technical personnel has learned to rely upon the use of these products in combating disease to a degree that would scarcely be credited by workers unfamiliar with Indian conditions. There are at least two questions which a stranger might excusably ask. First, why do not the provincial departments take it upon themselves to produce what they require in anti-rinderpest serum? This is surely something that does not require a high degree of technical skill, for the withdrawal of serum from convalescent cattle and the simple precautions required to obtain a yield of good potency have been sufficiently described by the Muktesar staff in fulfilling their duties as scientific research workers. The experience of Uganda shows how well rinderpest can be attacked by resort to local measures for supply of materials. Secondly, if serum is to remain an indispensable adjunct in combating rinderpest and cannot, for some reason, be made by the provincial departments, why not entrust its manufacture to commercial enterprise? This would eliminate the heavy costs of administration almost inseparable from a government department. It has been found in most countries to be the most suitable system for the production of the serum, the use of which bears most analogy to that of rinderpest serum in veterinary prophylaxis, namely, swine fever serum. In the United States of America where this serum is used in enormous quantities, the function of Government is limited to the issue of licences to competing commercial interests and the scrutiny of their products. There are, no doubt, backward countries, however, where all work of this kind can only be trustworthily performed by government officials.

Beyond all this, it must be said that it has been the experience steadily gained at Muktesar that has given the information required for the economic production of serum satisfactorily on the plains, and it may be that for reasons of the same kind the Muktesar station has not completely outlived its usefulness. But it cannot be denied that henceforward a great deal of veterinary research, hitherto centred at Muktesar, ought to be taken up by the several classes of institutions in India that could well carry out many sides of the work effectively, namely, the veterinary colleges, headquarters of veterinary departments, and universities. These institutions until now have almost entirely neglected the vast opportunities presented to them in this field, and so the outside reader must find exceptional interest in the brief statements upon the animal pathology of India contained in the report under review.

Research.—Some of the main findings are reviewed below.

Rinderpest.—The vaccine described by Daubney (1928) in East Africa was tried, using spleen pulp taken from cattle at the height of an attack, with and without peptone (one per cent.), treated with formalin (1-1500 in Ringer). The results were at marked variance with Daubney's, which were that the vaccine could be used immediately after preparation and for a period extending to seven days afterwards. The Muktesar vaccine proved highly infective for four days after

preparation without peptone and for 12 days with peptone. Without peptone it was found safe from the 12th to the 21st days, and with peptone from the 15th to 21st days. When cattle inoculated with the vaccines kept for these periods were tested later, in 15 days, with live virus, for immunity, none died of rinderpest; the cattle inoculated with the vaccines subjected to the more prolonged storage showed mild temperature reactions only. Though these results are considered encouraging, it is admitted that the vaccine cannot be applied easily in field practice in view of the very short time during which it is both safe and protective. A test was made of Kelser's chloroformed vaccine, 323 days after preparation: the results obtained with cattle tested 32 days after vaccination showed that although the vaccine had deteriorated considerably, it still had some protective value. The Director thus sums up the position in regard to these kinds of vaccine, "so far, the experiments carried out at this Institute have not proved that the vaccines used in other countries are as safe or efficient as the serum-simultaneous method, as practised in this country."

Some atypical rinderpest pyrexias are recorded notably early sudden rises in bulls and goats, 48 hours after subcutaneous injection of virus, and high fever (106-107° F.) in bulls between the 4th and 6th days after simultaneous injection of serum and virus. Fully active virus was found in the circulating blood of cattle exhibiting an almost symptomless reaction after inoculation of virus and, simultaneously, a large dose of serum.

As the result of an extensive experience gained in serum-simultaneous inoculations, with the use of goat virus, upon average plains cattle in Bengal, Mr. P. J. Kerr, Director, Civil Veterinary Department, Bengal, sought information as to whether the prescribed doses of serum could be much reduced or even eliminated altogether, and the virus inoculated safely alone. To obtain this information, 60 average plains cattle from the Bareilly region were inoculated with the virus; some were then inoculated simultaneously with much reduced doses of serum (preventive and special) and others with no serum. No reactions, beyond extremely mild ones in a small proportion of the animals, were seen. In spite of the Bengal and Bareilly experiences, however, no change is contemplated in the standard directions for the serum-simultaneous method, in view of the grave risks that may be entailed should it be applied to a territory in which the cattle are unusually susceptible.

Plasmoquine (Bayer) was found to have no curative property on rinderpest. Trypaflavine (Bayer) was found to cause rapid disappearance of the piroplasms (*Babesia bigemina*) which often complicate the course of rinderpest reactions, but it was found to have no curative effect on rinderpest. Likewise, iodine and iodides given at the height of a reaction were found to have no effect.

The employment of intravenous salt injections to improve the potency of anti-rinderpest serum, following the principles outlined some years ago by Madsen in the production of diphtheria antitoxin, has now been abandoned as of no real advantage, after extensive trial.

Foot-and-Mouth Disease.—A strain of virus isolated at Muktesar was found to remain viable for 425 days, but not longer, in the refrigerator. Three outbreaks occurred in the outkraals during the year, resulting in the death of 19 hill bulls. In two of these outbreaks, further trials were made upon the use of iodine intravenously as recommended by Walker and Taylor (1926). The experiments afforded full opportunity, it is claimed, for any beneficial effects of the drug to become manifest, but none could be seen, either in preventing the appearance of lesions or in shortening the healing period.

Anthrax.—A preliminary test in the laboratory confirmed the statement made by Mr. W. Harris, Supt., C.V.D., Assam, that white arsenic given intravenously to cattle suffering from anthrax at the stage of high fever exercised a curative action.

Johne's Disease.—A herd of cattle suffering from Johne's disease is now kept in isolation on a convenient area within the Muktesar station. The animals consist of naturally infected breeding animals obtained from the field. It is proposed to maintain them and their progeny under observation for a number of years. Comparative tests were made upon the value of avian tuberculin and two samples of johnin, namely, one obtained from England and another made at Muktesar, in diagnosis. The double intradermal method seems to have been used for this purpose. The johnin was not found to be in any way superior to avian tuberculin. When the bacilli are present in the lower bowel diagnosis is most easily made by the direct rectal smear method, but, when a negative result is obtained by this method, a positive one can often be obtained by the use of Krishnamurti's "bowel-washing" method. Further evidence was obtained during the year of the very wide prevalence of Johne's disease among dairy herds in India.

Bovine piroplasmoses.—Valuable observations are reported upon the susceptibility of Holstein bulls imported for the Army Department from South Africa and Holland to attacks of tropical redwater (caused by *Babesia bigemina*) and acute theileriasis (caused by *Theileria mutans*). These observations suggest that the *B. bigemina* parasites of Africa and India are immunologically identical, whereas the *T. mutans* parasites of the two countries are different. Plasmoquine seemed to exercise a beneficial action upon the course of acute theileriasis; "asuntol" and trypaflavine (Bayer preparations) had no good effect. Trypaflavine, however, was found to be superior to trypanblue in the treatment of *B. bigemina* infection. A fatal case of sporadic acute theileriasis was discovered in a hill bull

at Muktesar in 1930, the first case of the kind since 1923. This bull had been injected with rinderpest goat virus and died 17 days afterwards; transmission experiments with blood and organ emulsions to other hill bulls proved negative. That *B. bigemina* is transmitted by the tick *Boophilus australis*, and *T. mutans* by another tick, *Hyalomma ægyptium*, was indicated by a rather striking set of field observations.

Bovine nasal granuloma—In an outbreak affecting 50 per cent. of the 170 cattle at the Military Dairy Farm, Jubbulpore, the efficacy of tartar emetic, given intravenously in a dose of 10 grains every three days, was clearly established. The course of treatment is, however, a prolonged one, requiring at least ten injections, and any number short of what is necessary for a complete cure permits a recurrence within a few weeks. The period of incubation in this disease seems to extend to several months. Experiments in treatment were made with the less irritant antimony compounds, antimosan and neostibosan (Bayer), but the quantities required seemed to be so large that the use of the drugs had to be ruled out on the ground of expense. The question of the etiology of this disease is still unsettled, but, as Mr. Cooper suggests, it is likely to be a *Rhinosporidium*. The histological similarity of the lesions to actinomycosis had led Krishnamurti to believe that the causal organism was a streptothrix, which, together with a variety of other organisms, can readily be recovered from the lesions.

Other cattle diseases examined were hæmorrhagic septicæmia, pneumonia, bovine endemic hæmaturia, contagious abortion, streptococcic mastitis, surra (in buffaloes, successful treatment with Bayer 205), parasitic gastritis, and warble fly attacks.

Sheep and goat diseases.—Caseous lymphadenitis caused serious loss on a sheep breeding farm in the Punjab. Contagious abortion among goats on the Hissar cattle farm was traced to *Brucella melitensis*. The conditions known as "Phet" or "Pitto" disease in Sind and "Athela" in transport goats remain to be investigated.

Equine diseases.—Strangles at the Remount Depôts was not controlled successfully by preventive inoculation with Besredka's anti-virus. An atypical strain of *B. mallei* was isolated from a case of glanders. This strain resembled *B. whitmori* originally, but assumed the typical characters of *B. mallei* after repeated subculture. Freshly isolated strains of typical *B. mallei* were believed to be better suited for the preparation of mallein than strains which had been maintained in artificial culture for some years, even though they were regularly passaged through guinea-pigs. The use of meat digest broth for this preparation was abandoned, because complaints about the mallein had been received, and the older method of using peptone glycerine broth was resumed. Further work has been done on equine contagious abortion; three strains of *B. abortivo-equinus* were isolated from 16 fœtuses. The histories of 15 donkey stallions imported from America showed that some of them became infected with this organism, as shown by the agglutination test, within two months after arrival in India. Biliary fever was found, mainly from the examination of blood smears from Jhansi, to be caused by *Nuttallia equi* (40 cases) and *Babesia caballi* (3 cases); no cases of mixed infection were seen.

Canine diseases.—Work upon the transmission of the common variety of canine piroplasmosis in India caused by *Piroplasma gibsoni* was undertaken by Messrs. S. K. Sen and Krishna Iyer. When dogs were inoculated with blood from a naturally infected case, the parasites appeared in their blood after an incubation period of 9 to 31 days. This was associated with no appreciable fever, but with temporary loss in condition, and thereafter the dogs regained good health in spite of the fact that the parasites and pronounced anæmic changes were visible in the blood for at least six months. Pups born from an infected bitch showed the parasites in their blood immediately after birth.

From a case diagnosed clinically as canine typhus an organism closely allied to *Bacillus dysenteriæ* Shiga was isolated. It is believed that these cases of prolonged fever comprise a number of different infections.

Some promising results are mentioned in the treatment of eczema by subcutaneous injection of spleen extract.

Fowl diseases.—The name Avian Distemper had been used by Mr. P. J. Kerr in his Annual Report of the Civil Veterinary Department in Bengal, 1928-1929, for the disease first referred to in India as "Ranikhet disease," which was again first studied and described by Doyle in England as "Newcastle disease." Mr. Cooper thinks that the name Avian Distemper should be retained, as an apt descriptive name for the disease, to avoid confusion in nomenclature. [The reviewer has elsewhere already maintained that pending a more complete understanding of its pathology, the disease might be conveniently referred to as "Doyle's Disease," in honour of its discoverer.] This disease has assumed rather alarming dimensions in Eastern countries in recent years, and the following new observations made by Messrs. Cooper and Menon are of interest. A new strain of virus obtained from Java proved to be immunologically identical with the Indian, English, and Philippine strains previously studied. A strain obtained from Kodaikanal, in Southern India, was also identical. All strains proved highly virulent for Indian green parroquets (*Psittacula krameri*, Scop.) and pigeons, but geese and ducks proved relatively highly resistant. Crows were again found to be highly susceptible, death taking place within four days after inoculation, and material taken

from them *post-mortem* proved fully virulent for fowls. A sick crow was caught at Muktesar, and material taken from it set up the disease in fowls. An anti-serum was obtained from fowls inoculated with each of the above strains; the serum was protective against all other strains. A potent serum could not be obtained from geese and ducks.

An outbreak of fowl typhoid among fowls in the Kumaun Hills was studied. The causal organism was found to be serologically identical with strains of *Salmonella gallinarum* and *pullorum* obtained from England.

Locust destruction.—Sodium fluosilicate had been found in India to be suitable for the destruction of locusts in the field, but was toxic on drenching to cattle in half-ounce doses. Greenland cryolite, a fluoride of aluminium and sodium, found in natural deposits on the coast of Greenland, was also submitted to toxicity tests and was found to be non-toxic when drenched to hill cattle and buffaloes in one pound doses. No grazing tests were, therefore, considered necessary.

Figures are given for a large amount of material that came for routine examination. The technical staff is to be congratulated upon the amount and variety of useful information recorded. During the latter half of the year, Mr. W. Taylor, Principal, Lahore Veterinary College, officiated as Director. A notice is inserted that copies of the report can be obtained free of charge by heads of veterinary departments and institutes in exchange for their technical reports, on application to the Director.

J. T. E.

THE HARDY "SHETLAND"

"A notable feature of the inspection results under the Horse Breeding Act has always been that few if any Shetland ponies fail to pass," says the *North British Agriculturist.* "This breed has always been regarded as the healthiest and soundest of the horse family and it has been claimed that they are practically immune from hereditary diseases of the bones and joints. An investigation into the matter has recently been made by Professor W. Macgregor Mitchell, of the Royal (Dick) Veterinary College, who visited Shetland and examined more than a hundred ponies on the mainland and in the islands. His object was to endeavour to ascertain whether the natural food of these ponies in the native habitat or the climate had anything to do with their immunity from bone diseases, or whether it was due to other factors. Of course, the fact that these ponies remain out in the open, summer and winter, must have a considerable influence upon their constitutional hardiness. It is stated that a number of typical ponies may be brought south for the purpose of further examination and study with the view of establishing the reason for their remarkable freedom from bone diseases, as any reliable information on the subject may have an important bearing upon the problem of eradicating a common and serious trouble amongst other horses, particularly heavy draught and work horses."

N.V.M.A. Divisional Reports

VETERINARY MEDICAL ASSOCIATION OF IRELAND*

ANNUAL GENERAL MEETING AT DUBLIN

The Annual General Meeting of the Veterinary Medical Association of Ireland was held in the Gresham Hotel, Dublin, on Wednesday, February 3rd, 1932.

The following members were present:—Professor T. G. Browne (Hon. Treasurer), Messrs. P. Harnett, J. J. Dundon, E. Cunningham, S. Donovan, J. M. Murphy, D. McCarthy, J. M. Morris, P. E. Mullaney, J. J. Condon, M. J. MacClancy, C. M. Griffin, Thos. F. O'Brien, D. Reeves, J. P. Nowlan, J. E. Kenny, J. F. McMenamin, W. J. King, P. Crowley, A. F. O'Dea, P. F. Dolan, L. M. Magee, J. D. Whitty, A. A. Donnelly and Professor J. J. O'Connor (Hon. Secretary and outgoing President).

The minutes of the previous Annual General Meeting (January 29th, 1931), having been printed and circulated, were taken as read and were confirmed and signed.

CORRESPONDENCE

(1) From Dr. Bullock, Secretary, Victoria Veterinary Benevolent Fund, thanking the Hon. Secretary for his letter *re* the orphans of the late Mr. Barry and enclosing a copy of a letter which he had sent to Mr. Howard (*a*) acknowledging receipt of his letter on the same matter and giving a list of seven beneficiaries from the Fund in Ireland; (*b*) appealing to him to impress upon members of the profession in Ireland their obligation to help the Fund.

The Chairman said this was a strong reminder of the obligation of the members of the profession in Ireland to support this Fund. He was sure it was forgetfulness on the part of those members who did not subscribe. The amount of money granted to distressed relatives of deceased veterinary surgeons in Ireland exceeded the amount subscribed. He advised members to make arrangements with their banks to pay the amount of the annual subscription of 10s. 6d. to the Fund. This was a small amount which nobody would grudge for such a deserving object.

(2) From Mr. W. J. Foley, of Tralee, regarding the inadequate salary he receives for carrying out the Tuberculosis Order and his failure on repeated occasions to have his claim for increased remuneration granted, and appealing to the Association to take up his case with a view to having his grievances redressed.

It was decided to write to Mr. Foley asking him what payment would compensate him for the services rendered and to give a return of the number of cases attended and the miles travelled in a given period.

*Received for publication April 9th.

(3) From Mr. F. Crowne, of Limerick (1) asking if any particulars have been received from the Department of Agriculture relative to their intended treatment of the Veterinary Meat Examiners under the Fresh Meat Act; (2) stating the existing terms of their appointment on a temporary basis; and (3) saying that the Department proposed dispensing with the services of two members of the staff as being unnecessary.

The matter was discussed and it was decided to communicate with the Minister for Agriculture asking him to receive a deputation thereon with a view to having the Examiners appointed on a permanent basis; the deputation to consist of the President, the Hon. Secretary, Messrs. P. Harnett and D. F. McCarthy.

It was decided to ask for the reception of the deputation before February 15th, as the matter was very urgent.

(4) From the Secretary of the Royal Sanitary Institute, giving information *re* the forthcoming Congress to be held at Brighton on July 8th-16th, 1932, and enclosing a form of membership to be filled by a delegate if appointed.

It was decided to ask Mr. Dolan to represent the Association at the Congress should he attend it as a delegate from the Public Health Department of the City of Dublin.

Mr. Dolan said he would have much pleasure in doing so should he be present at the Congress.

(5) From Mr. B. Fitzsimons, Private Secretary to the Minister for Agriculture, acknowledging (January 30th, 1932) the receipt of the Hon. Secretary's letter of January 29th to the Minister relative to the appointments of the Veterinary Officers under the Agricultural Produce (Fresh Meat) Act.

(6) From Mr. T. McDermott Kelly, Athenry, regretting inability to attend the meeting and wishing it every success.

(7) From Mr. A. J. McDonald, Kildorrery, in reply to the Hon. Secretary's letter *re* adequate remuneration for his services as Meat and Milk Inspector in his district and saying that he could not carry on the duties under £100 per annum.

(8) From Mr. T. R. Hunt, Mitchelstown, in reply to the Hon. Secretary's letter on the same matter as No. 7, giving particulars of the duties required of a Veterinary Inspector of Meat and Milk in his district and stating what, in his opinion, should be the minimum remuneration for the services rendered.

(9) From Mr. J. Dodd, Sligo (1) regretting inability to attend the meeting; (2) congratulating the Association on the selection of their President ("a better and more energetic man could not be selected—he has done his bit for the Association"); and (3) wishing success to the meeting.

(10) From Mr. J. S. MacCann, Tullamore (1) regretting inability to attend the meeting; (2) congratulating the Hon. Secretary on the excellent report of the year's work of the Association; (3) expressing appreciation of the work of the officers of the Association and regretting that the meetings were not largely and regularly attended; (4) referring to the extraordinary amount of work carried out by the Council and by the Committee appointed for the purpose in connection with the passage of the Veterinary Surgeons Bill through the Oireactas and expressing thanks for these services; (5) suggesting that the annual subscription be reduced to 10s. 6d., as the increased fee of one guinea was introduced during the War and there was no need to continue it now; (6) sending every good wish for a successful year in 1932.

The Chairman said it must be very gratifying to the officers of the Association to have their services so highly appreciated by Mr. MacCann, who was one of the staunchest supporters of the Association. He was sure they would agree with him that Mr. MacCann deserved their best thanks. (Applause.)

Professor J. F. Craig, and Messrs. McCorry, Coulter, Browne, J. V. Carroll, P. J. Howard, A. J. McDonald and H. R. Langley sent messages apologising for absence from the meeting and wishing it success.

HON. SECRETARY'S REPORT

Professor J. J. O'Connor now presented his report for the year, as Hon. Secretary of the Association, and this was unanimously adopted. The report was as follows:—

During the past year there were held six general meetings, four being ordinary quarterly meetings, one a special meeting at Limerick and one a special meeting convened for the purpose of selecting, at the request of the Minister for Agriculture, sixteen members of the profession whose names were to be sent forward as suitable for nomination on the Veterinary Council of Saorstat Eireann.

The average attendance at the meetings was 30, the largest attendance being 37 at the special meeting in Dublin. There were 35 at the May meeting, when practical demonstrations were given, and 35 at the special meeting at Limerick.

The following papers were read at the meetings:—

1. "Tuberculosis in Swine," by Mr. J. J. Dundon, at the Limerick meeting held on July 18th, 1931.
2. "Observations on the Tuberculosis Order." "Some interesting Cases and Methods of Treatment," by J. S. MacCann, at the quarterly meeting in Dublin held on August 4th, 1931.
3. "Vaginal and Rectal Exploration," by L. M. Magee, at the quarterly meeting in Dublin held on December 10th, 1931.

These papers were of great interest and excited keen discussion.

Practical demonstrations were given at the May meeting *viz.*:—

1. Treatment of Sterility, by Professor J. F. Craig;
2. Spinal (Epidural) Anæsthesia in Cattle, by Professor T. G. Browne;
3. Intradermal Tuberculin Test, by Sean O'Donovan;
4. Treatment of Stricture of the Teats in Cows, by A. A. Donnelly;
5. Passage of the Stomach-tube, by J. J. Cosgrove;

6. The use of Obstetric Instruments, by F. J. Daly.

This meeting proved very attractive and the demonstrations were greatly appreciated by the large number of members present.

The meeting at Limerick was the second General Meeting held outside Dublin and, like the first one held in Cork, was a very enjoyable re-union and an outstanding success from every point of view. The provincial meeting is now looked forward to as an annual event and it is hoped to hold one during the coming year in the West of Ireland.

Ten Council meetings were held at which various matters were discussed, including:—

(1) The Eradication of Bovine Tuberculosis, on which a special Report was issued and published in the *Veterinary Record* and daily press.

(2) *The Veterinary Surgeons' Bill.*

This occupied a great deal of time at every meeting prior to its passage through An Dail and An Seanad, in addition to the time spent in connection with it by the Special Committee appointed to deal with the matter.

(3) *The Grievances of the Veterinary Staff of the Department of Agriculture.*

A great deal of time was devoted to this matter, as it has an important bearing on the status of the veterinary profession in this country, the inadequate remuneration which the staff receive serving as a standard for the fixing of salaries for other veterinary appointments and reflecting on the veterinary profession as compared with the medical and other professions. The National Veterinary Medical Association are actively supporting the V.M.A.I. in this agitation for the redress of these grievances.

Last year the intervention of our Association was successful in having all unestablished officers put on the established list and having unestablished service counted for pension purposes. This year it succeeded in having the initial salary raised from £200 to £250 per annum. It is expected to get further concessions this year.

(4) *Fees for the Examination of Horses, Colts and Fillies for the Department of Agriculture and for acting as Referee.*

A resolution was sent forward to the Department demanding increased fees for these services and a circular was issued to the profession about the matter.

(5) *The Production of Clean Milk.*

Mr. Dolan was appointed as representative of the V.M.A.I. to accompany Mrs. Crichton, the Secretary of the Irish Clean Milk Society, on a deputation to An Dail urging the introduction of legislation for the production of clean milk.

(6) *The Free Treatment of Animals of the Poor.*

This matter was considered by the Council at the request of the N.V.M.A. and the profession were circularised advising them to keep in touch with the activities of any Society or Organisation formed for the purpose.

(7) *Salaries for Local Appointments in North Leitrim, Mayo and Cork Rural District.*

The intervention of the Association prevented the appointments being filled at the advertised salaries, which were considered inadequate.

(8) *Remuneration for Veterinary Surgeons acting as Meat Inspectors under the Local Government and Public Health Acts.*

This question is still under consideration.

(9) *Fees paid by the Department of Agriculture to Part-time Portal Veterinary Inspectors.*

A demand for increased fees is being made to the Department.

(10) *Fees paid to Veterinary Surgeons as witnesses in Court Cases.*

Consideration of the foregoing matters involved voluminous correspondence.

The following new members were elected during the year:—M. O'Connor, J. J. Beirne, W. King, P. Crowley, J. Lowndes, Mrs. J. Lowndes, D. Reeves, P. McManus, M. J. Glynn, Captain J. F. O'Grady, Patrick Harnett, M. J. Joyce, Nicol Nicolson, V. G. Hinds, Patrick McDonnell, John J. Brennan, George Jarratt, Miss Bissett, Sean Hyde, A. J. McDonald, T. J. Carroll, Michael Donohoe, Captain P. C. Creagh, Captain O'Brien and S. H. Power.

Hon. Treasurer's Report.—The Report for the year 1931 of the Hon. Treasurer (Professor T. G. Browne) was unanimously adopted, a very satisfactory financial position being shown.

REPORT OF COUNCIL

The following report of Council was read and received:—

Veterinary Benevolent Fund.—An application for relief from the relatives of a deceased practitioner was forwarded for sympathetic consideration to Dr. Bullock, Secretary of the Fund. The Council wish to remind members that there is an obligation on Irish veterinary surgeons to support this Fund.

Duties and Salaries of Meat and Milk Inspectors.—Correspondence with the L.G.B. elicited a lengthy statement of the position with regard to the duties of these inspectors. On consideration, it was decided to communicate with the veterinary surgeons who are complaining of onerous duties and inadequate pay and to ask them for a list of the duties which they perform and for their views as to the rate of remuneration which they would consider reasonable for the posts.

Provision of Free Treatment for Animals of the Poor.—A communication was received from an officer of the Southern Association saying that it was not considered that this matter had any degree of urgency, but that the recommendations of the Council of the V.M.A.I. would be borne in mind.

Grievances of Veterinary Officers of the Department of Agriculture.—A statement was received from the Secretary of the Association of Veterinary Officers of the Department of Agriculture and it was considered by the Council. It was decided to revise the statement and to forward it with a covering letter to the Minister of Agriculture. This had been done, but no reply had yet been received.

Meat and Milk Inspectors.—A deputation was received on behalf of those engaged in veterinary work in connection with the Fresh Meat Act. It was decided to communicate their views to the Minister of Agriculture, with the Council's recommendation for early attention to the matter. A letter had been sent to the Minister.

Nomination of Officers for 1932.—The following officers were nominated for 1932. (The names of those nominated appear on the voting paper sent to all members.)

Annual General Meeting.—It was decided to hold the Annual General Meeting on Wednesday February 3rd, 1932, in the Gresham Hotel, at 8 p.m., and to consider the following matters at the meeting:—Revision of Rules; Reduction of Annual Subscription; Attendance at Meetings.

ELECTION OF OFFICERS

Messrs. Kenny and Nowlan were appointed scrutineers of the voting papers. The result of the election of officers was as follows:—

President.—A. A. Donnelly (unopposed).

Vice-Presidents.—A. F. O'Dea and J. M. Murphy.

Hon. Treasurer.—Professor T. G. Browne (unopposed).

Hon. Secretary.—Professor J. J. O'Connor (unopposed).

Members of Council.—Sean O'Donovan, J. J. Dundon, J. J. Condon, A. F. O'Dea, P. A. Rogan and P. Harnett.

INDUCTION OF PRESIDENT

The Chairman, having declared the above-mentioned officers elected, said that concluded his term of office as President and he desired to tender his thanks to the officers and members of the Association for the support which they gave him during his occupancy of the chair.

The duties of the officers during the past year had been very strenuous, but they carried them out willingly and efficiently. He congratulated the members on their choice of a successor. They could not have selected a more suitable President or one more deserving of the honour of Presidency of that Association than Mr. Donnelly. Although he was a busy practitioner living a long distance from the city he was very regular in his attendance at the General and Council Meetings and took a real interest in the work of the Association. They were familiar with the sacrifice which he recently made in its interests, whereby he gave an example which, if followed, would go far towards solving some of the problems of inadequate remuneration for public veterinary services. Apart from his professional qualification, Mr. Donnelly would be an ornament to the chair. He had great pleasure in calling upon Mr. Donnelly to occupy the chair.

Mr. Donnelly, on taking the chair, was received with applause. He said he wished to thank the members for the honour they had conferred on him by electing him to the Presidential Chair. He recognised the responsibility of the position and his shortcomings to fill it, following in the footsteps of so many distinguished predecessors, but he would do his best to promote the interests of the Association. He would not inflict an address on them that evening, but on a future occasion he would make some remarks on matters affecting the interests of the profession.

Election of Members.—The following new members were unanimously elected:—John Redmond Carey, Veterinary Department, Anglesea St., Cork; Patrick J. Nolan, Veterinary Department, Athenæum Buildings, Limerick.

REVISION OF RULES

Mr. Dolan said that he and Professor O'Connor had gone over the Rules of the Association and they came to the conclusion that they required little or no alteration. After discussion, however, the following alterations were decided upon:—

(1) On the motion of Professor Browne, seconded by Mr. McClancy, it was decided unanimously that there be two Vice-Presidents instead of four.

It was also unanimously decided that the following alterations be made:—

(2) (*Rule 33*).—"No member shall be entitled to speak more than *five* consecutive minutes, except with the permission of the President, on the subject under discussion; and after all who wish to do so have spoken, the essayist or mover of a resolution shall be entitled to *ten minutes for his reply.*"

(3) (*Rule 16*).—"*Order of Business.*"

(*a*) The reading of the minutes of the last General Meeting by the Secretary.
(*b*) Signing of minutes by President, if approved of by those present.
(*c*) Election of new members.
(*d*) Nomination of candidates.
(*e*) Routine and other business.
(*f*) Reading of paper and discussion thereon.
(*g*) The introduction and consideration of any other matters not provided for in the foregoing Rules of Procedure, to be at the discretion of the President, with the general approval of the meeting.
(*h*) Exhibition of specimens, with observations thereon.

(4) (*Rule 39*).—*Annual Dinner.*

This rule, referring to arrangements for the Annual Dinner, was deleted.

(5) (*Rule 5*).—This rule was altered to read "Only Members of the Royal College of Veterinary Surgeons and those who hold a Veterinary Diploma for the time being recognised by the Veterinary Council or Saorstat Eireann shall be eligible for election as members."

(6) (*Rule 4*).—This rule was altered to: "The Association shall consist of:—

(i) Members, Corresponding Members, Honorary Associates and also lady Veterinary Surgeons whose husbands are duly elected members of the Association.

(ii) Executive Officers, *viz.*, a President, *two* Vice-Presidents, a Treasurer, a Secretary, such past-Presidents of the Association as continue to be subscribing members, and ten Members shall be styled the Council."

(7) (*Rule 9*).—This rule was altered to:—"Each member shall pay, in advance, an annual subscription of half-a-guinea (10s. 6d.), which shall fall due on the first day of January in each year. Lady Veterinary Surgeons entitled to membership under Rule 4 shall be exempt from payment of this subscription. No member shall be entitled to exercise any of the privileges of the Association who shall be in arrear with such subscription unless by special sanction of the Association."

On the motion of Professor Browne, seconded by Mr. O'Donovan, it was unanimously resolved that the annual subscription be reduced to 10s. 6d.

It was decided to circularise the members of the Association to this effect and to notify members who are in arrears with the subscription that they can retain their membership of the Association by paying the current year's subscription and agreeing to pay the arrears when they find it convenient to do so.

John Henry Freeman Memorial.—It was decided to defer the consideration of this matter until the five years' course of study for veterinary students will be in force.

Vote of Thanks for Outgoing Officers.—Mr. O'Donovan proposed a vote of thanks to the outgoing officers, which was passed with acclamation. The Hon. Secretary and the Hon Treasurer suitably replied.

National Veterinary Medical Association of Great Britain and Ireland.—Mr. O'Donovan referred to the proposal of the Council of the N.V.M.A. of Great Britain and Ireland to change the title of the Association to the "British Veterinary Association." He proposed that the V.M.A.I. strongly protest against the proposed change of title of the N.V.M.A. of Great Britain and Ireland on the grounds:—

(1) That Ireland was a separate nation from Great Britain.

(2) That if the name was changed as proposed, its representations to the Irish Free State Government on matters concerning the veterinary profession in the Irish Free State would not be considered.

Mr. Whitty seconded the motion, which was passed unanimously.

J. J. O'Connor, *Hon. Secretary.*

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YORKSHIRE DIVISION

JOINT MEETING WITH THE YORKSHIRE BRANCH OF THE SOCIETY OF MEDICAL OFFICERS OF HEALTH

The above meeting was held at the Town Hall, Leeds, on Friday, February 26th, 1932. Four years ago the Medical Officers' Society invited the Division to take part in a meeting which was held in Wakefield and on this occasion the Division took the opportunity of extending to the Yorkshire Branch of the Society of Medical Officers of Health an invitation to participate in a joint meeting at which an important and mutually interesting paper was to be presented by Dr. F. C. Minett, Director of the Research Institute in Animal Pathology, Camden Town, London.

Lieut.-Colonel J. A. Dixon, President of the Yorkshire Division, occupied the chair.

In the absence of the Lord Mayor of Leeds, a civic welcome was extended to the meeting by the Deputy Lord Mayor, Mr. Councillor George Brett.

Before calling on Dr. Minett to read his paper, the Chairman conveyed to the Deputy Lord Mayor the thanks of all present for his presence there that day and for the kind welcome which he had given to the meeting.

Following the paper and discussion (for which see the commencement of this issue) the meeting was entertained to afternoon tea in the Lord Mayor's parlour. Thanks expressed on behalf of the meeting, to be conveyed to the Lord Mayor by Dr. L. Pickering Pick, were acknowledged by the Deputy Lord Mayor.

Dr. H. T. Bates, President of the Yorkshire Branch of the Society of Medical Officers of Health, at the conclusion of the meeting, proposed a vote of thanks to Lieut.-Colonel Dixon, not only for his occupation of the chair that day but also for the great deal of work he had done in making arrangements for the meeting with the Lord Mayor and the Leeds City Council. This was heartily accorded and concluded the proceedings of a very successful and useful meeting.

S. Sharp, *Hon. Secretary.*

IN PARLIAMENT

The following questions and answers have been recorded in the House of Commons recently:—

FOOT-AND-MOUTH DISEASE

Captain Cazalet asked the Secretary of State for Dominion Affairs whether he has any information to give the House in regard to the state of foot-and-mouth disease in Southern Rhodesia; and whether he has received any representation from the Government of that Colony in regard to this matter?

Mr. Thomas: The most recent information that I have received as to foot-and-mouth disease in Southern Rhodesia is that there has been very little spread of the disease lately and that the prospects of its dying out are good. The matter has not formed the subject of representations to me by the Government of Southern Rhodesia, but the Governments of Southern and Northern Rhodesia have been in correspondence with regard to the problem arising out of the existence of the disease in Southern Rhodesia, and a Veterinary Conference consisting of representatives of these Governments and of the Governments of the Bechuanaland Protectorate and the Belgian Congo was held last December in Southern Rhodesia to consider them.

Mr. T. Williams asked the Minister of Agriculture the number of cattle slaughtered as the result of foot-and-mouth disease in 12 months to the last convenient date and the amount of compensation paid?

Sir J. Gilmour: In the 12 months from April 24th, 1931, to April 23rd, 1932, 3,654 cattle, 5,409 sheep, 1,204 swine, and four goats were slaughtered in connection with outbreaks of foot-and-mouth disease, and £95,483 13s. was paid as compensation to the owners of the animals.

Mr. C. Williams: Did any of the goats come from Carnarvon?

Sir W. Wayland: Is the policy of the Board the same to-day as it was last year in connection with the slaughter of animals on a farm attacked by foot-and mouth disease?

Sir J. Gilmour: Generally, we are maintaining the slaughter policy, but we are experimenting in some cases.

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REORGANISATION COMMISSIONS

Mr. Glossop asked the Minister of Agriculture if the terms of reference of the milk re-organisation commission will be so framed as to consider the re-designation of the various grades of milk?

Sir J. Gilmour: I would refer my hon. Friend to the terms of reference of the Commission which I announced in this House on April 18th. The Commission will themselves decide on the scope of their inquiries in the light of these terms of reference, but I do not anticipate that they would regard themselves as precluded from considering the matter referred to.

Brigadier-General Clifton Brown: May I ask whether any milk reorganisation would not deteriorate the quality of the milk, unless the designations of this milk are altered?

Sir J. Gilmour: As far as I am concerned, this commission will investigate the problem in all its aspects, and I think we must await that.

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PRIVATE MOTOR CARS (GOODS)

Mr. Hales asked the Minister of Transport whether his attention has been drawn to a recent decision in the King's Bench Divisional Court that it is illegal to carry goods or parcels in a private motor car; and, having regard to the possibility of the prosecution of motor owners, if he will take immediate steps for the removal of this restriction?

Mr. Pybus: Immediately after the decision of the Divisional Court to which my hon. Friend refers I got into consultation with my right hon. Friend the Chancellor of the Exchequer as to the situation which has been created, and will make a statement at the earliest possible moment.

Mr. Hales: In view of the very serious trouble among the small traders who are using their cars partly for business and partly for pleasure, will the hon. Gentleman give an assurance that they may be able in the meantime to use those cars without the fear of any police interference?

Mr. Pybus: No, Sir, I cannot give any such assurance, but I have caused a circular to be sent to licensing and registration authorities requesting them to maintain their existing practice pending the further consideration of the matter.

Mr. Pike: Can my hon. Friend say whether the owner of a private car is entitled to take home a pound of vegetables?

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HORSE RACING (KING'S PLATES)

Mr. Mabane asked the Financial Secretary to the Treasury whether the races for the King's Plates in Ireland were run in 1931 in the Irish Free State or in Northern Ireland?

Major Elliot: All the races were run as usual, seven in the Free State and one in Northern Ireland.

Mr. Mabane: Can the Financial Secretary say what he expects to be the result of these races in the current year, and whether the result has justified the imposition on the taxpayer of this country of a sum of £1,563 for prizes for these races run in the Irish Free State?

Major Elliot: It would be impossible, as in the case of the Budget, to anticipate the result of these races.

PREMIUM BULLS

Captain D'Arcy Hall asked the Minister of Agriculture if he will consider making a grant in aid of the scheme put forward by the Premium Bull Societies' Association, which aims at improving the marketing of store cattle, particularly in view of the extent of the importation into Wales of Irish store cattle?

Sir J Gilmour: I regret that I have no funds available from which to make a grant to this association, the good work of which I am glad to acknowledge. I would remind my hon. and gallant Friend that the Bull Societies comprising the association are already assisted under the Ministry's scheme for the improvement of livestock.

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NARCOTIC DRUGS MANUFACTURE (CONVENTION)

Lieut.-Colonel Fremantle asked the Home Secretary whether British ratification of the 1931 Convention for the limitation of the manufacture of narcotic drugs has yet been decided upon; and, if not, when is a decision regarding ratification likely to be made?

Sir H. Samuel: It is the intention of His Majesty's Government to ratify this Convention and, to enable this to be done, the Dangerous Drugs Act, 1932, was passed with the object of bringing our law into conformity with the provisions of the Convention.

Lieut.-Colonel Fremantle: As this has already passed the other House, how long will it be before there is ratification? Will it be before the summer?

Sir H. Samuel: I cannot give a precise date. We are in communication with the Dominions and Colonies on the subject.

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DANGEROUS DRUGS

Mr. D. Grenfell asked the Home Secretary what was the production in Britain during the 12 months ended December 31st, 1931, of cocaine, codeine, dionin, heroin, morphine, and peronin; whether the production was in excess of the requirements for medical and scientific purposes; and whether the convention for the limitation of the manufacture of narcotic drugs is operative in Great Britain?

Sir H. Samuel: As the answer to the first part of the question contains a number of figures, I propose, with the hon. Member's permission, to circulate a statement in the *Official Report*. The answers to the second and third parts of the question are in the negative.

Following are the figures:	*ozs.*
Cocaine Alkaloid and Salts	14,903·036
Codeine	12,525·74
Dionin	2,013·06
Heroin (Diacetylmorphine)	3,326·4
Morphine Alkaloid and Salts ...	46,520·74
Peronin	Nil.

. . . . .

POISON GAS EXPERIMENTS

Lieut.-Colonel Applin asked the Financial Secretary to the War Office if he would state the number of horses and dogs, respectively, which have been the subject of poison gas experiments in Great Britain during 1930 and during 1931 at Porton, Cambridge, or elsewhere?

Mr. Cooper: Eight horses were used for experimental purposes at the Chemical Defence Experimental Station, Porton, in 1930. Apart from this, no horses or dogs have been used for experiments in connection with chemical defence, either at Porton or Cambridge, during the two years in question.

XUM

Notes and News

DIARY OF EVENTS

May 19th.—R.C.V.S. Council Election Voting Papers issued.

May 26th.—R.C.V.S. Last day for receipt of Voting Papers.

May 26th.—Meeting of the Midland Counties Division, N.V.M.A., at Wolverhampton.

June 2nd.—R.C.V.S. Annual General Meeting. V.V.B. Fund Annual General Meeting.

June 9th.—D.V.S.M. Written Examination begins.

June 10th.—R.A.V.C. Annual Dinner, Hotel Victoria.

June 13th.—D.V.S.M. Oral Examination begins.

June 29th.—R.C.V.S. Committee Meetings begin.

June 30th.—R.C.V.S. Annual Dinner.

July 1st.—R.C.V.S. Council Meetings.

July 6th.—R.C.V.S. Summer Examinations begin.

Aug 11th.—Royal (Dick) V.C. Alumnus Lunch at Folkestone.

Aug. 8th-13th.—N.V.M.A. Jubilee Congress at Folkestone.

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PERSONAL

Captain Pillers' Appointment.—At their meeting on May 4th, Liverpool City Council approved of the appointment by the Health Committee of Captain A. W. Noel Pillers, F.R.C.V.S., D.V.S.M., as chief veterinary officer, in succession to Mr. T. Eaton Jones, who has retired on superannuation.

The Council placed on record its appreciation of the services given to the city by Mr. Eaton Jones during the 37 years he has been with them.

. . . . .

Colonel Simpson as British Legion Group President.—Among the many members of the profession who are keen participants in the activities of that supremely useful ex-Service men's organisation, The British Legion, none has rendered more devoted service than the Association's President, Lieut.-Colonel P. J. Simpson. We extend our congratulations to him, therefore, on the fact that in his year of office as President of the Ivy Leaf (Maidenhead) Branch of the Legion, he has been unanimously elected by all the branches within a radius of ten miles of Maidenhead as their Group President.

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Will.—Roots, Mr. William, of Brighton, veterinary surgeon (net personalty £10,842), £11,647.

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Lieut.-Colonel T. Dunlop Young.—Through the Argentine Ambassador in London, Colonel T. Dunlop Young, the Veterinary Inspector to the City Corporation, has been invited to the International Cold Storage Congress at Buenos Aires in August next. The necessary leave of absence has been accorded him.

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CONFERMENT OF EDINBURGH UNIVERSITY DEGREES

At the Spring Graduation of the University of Edinburgh Mr. James Steedman Blair, M.R.C.V.S., had the Degree of B.Sc. in Veterinary Science conferred upon him.

On the same occasion the following members of the Royal College of Veterinary Surgeons received the Diploma of Tropical Veterinary Medicine (D.T.V.M., UNIV. EDIN.):—William Alexander Allan, Uganda; Walter John Easton Mackenzie, Hong Kong; Edgar Messervy, Tanganyika; Harsh Bahadur Shahi, M.SC., India; and Henry Gordon Stewart, Uganda.

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OBITUARY

THE LATE CAPTAIN J. W. HOPKIN, M.R.C.V.S.

In reference to Captain Hopkin's death, reported in our last issue, the *Henley Standard* says:—"Captain Hopkin had for many years practised in Henley as a veterinary surgeon and was a well-known figure in the town. He was a member of the R.C.V.S., and took his B.A. at Oxford. During the late war he saw a good deal of service in the Near East, being attached to the Veterinary Corps. He also served in the Matabele and South African Wars. His death took place after an illness of about five weeks' duration. His widow, two sons, and one daughter survive him."

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Kelly.—On May 4th, 1932, following two operations for appendicitis, at Srinagar, Kashmir, India, Elizabeth Eleanor (Kitty), dearly loved wife of Major A. J. Kelly, R.A.V.C., and beloved daughter of Major H. Allen and Mrs. Allen; aged 24 years.

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ARMY VETERINARY SERVICE

MOVEMENTS OF OFFICERS

Major J. Robertson was posted from Edinburgh to Aldershot for duty on April 18th.

Major G. W. Godwin is at present in this country on sick leave from China.

The following officers are at present in this country on leave from India:—

Colonel W. E. Schofield, O.B.E.; Lieut.-Colonel T. E. Burridge; Major R. C. G. Thwaytes; Captain J. J. Kane; and Captain J. F. L. Taylor.

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"GENATOSAN" BIOLOGICS AND THE PROFESSION

We have received from Messrs. Genatosan, Ltd., Loughborough, the welcome intimation that the issue of their veterinary vaccines and sera is to be restricted to members of the profession. Chemists will no longer be supplied with these products, but in order to avoid disappointment in any genuine business between veterinary practitioners and chemists, the firm are completing arrangements by which supplies, while despatched direct to veterinary surgeons, may be invoiced through the chemist.

TUBERCULIN-TESTED HERDS IN SCOTLAND

In a survey of tuberculin-tested herds in Scotland which are licensed for the production of graded milk, undertaken by the Hannah Dairy Research Institute, it has been found that the average number of re-actors in the year did not exceed three per 100 head of milking stock, while in well-established herds the proportion was even lower. Moreover, an examination of the case histories of the re-actors indicated that at least 90 per cent. had contracted infection from avoidable sources. In the institute's annual report it is stated that satisfactory progress has been made in the experimental eradication scheme initiated by the institute in a selected area in Ayrshire. Of the 22 herds in the area, 19 are now free from the disease, while the proportion of re-actors in the remaining herds has been markedly reduced. It is claimed that the general information which has been obtained in the area indicates both the feasibility and desirability of immediate adoption of a more general scheme for the voluntary eradication of bovine tuberculosis. This work has been carried out with the aid of a grant from the Medical Research Council.

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The Secretary of State for Scotland informed Lord Scone that the numbers of cases of sheep-stealing in Scotland during the past five years were as follows:—18 in 1927; 14 in 1928; 12 in 1929; 16 in 1930; and 22 in 1931.

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As an illustration of the plight of farmers in the Orange Free State, 800 sheep carrying 16 months' wool were sold for 3d. each at the sale of an assigned estate at Harrismith.—*Exchange.*

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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TUBERCULIN TESTS IN CATTLE

To the Editor of the Veterinary Record.

Sir,—In view of the present controversy regarding the tuberculin tests as applied to cattle, I append herewith the details of the double intradermal and subcutaneous tests which I have recently applied to eight cattle with the results shown. It will be noted that seven out of the eight cows reacted to the double intradermal test, whilst only four of the same eight gave a definite reaction to the subcutaneous test. The farm at which these tests were carried out has been tubercle free for many years and no animals are brought into the herd until such time as they have given a negative reaction to the double intradermal test. The results of the tests on this occasion reveal some rather interesting points: firstly, cow No. 12 was tested by the intradermal method on February 3rd this year when she passed and was admitted to the herd, much against the wishes of the Farm Manager, who had hopes that she would fail the test, his objection being her abnormally large teats. Cows Nos. 17 and 18 have been tested previously on at least 16 occasions, starting as heifers before calving, and in this connection it is worthy of note that both the above-mentioned tests have been applied to these two cows on about an equal number of occasions. Both of these animals would appear to have given a definite reaction to the intradermal test, while they pass the subcutaneous test. Cow No. 5 gives a definite non-reaction to the intradermal test, the result of the subcutaneous test on the same animal being in my opinion doubtful.

It is hoped that perhaps some of your readers can throw some light on the results of these two tests. It is further hoped that I shall have an opportunity of retesting at least some of the reactors, and also that I shall have an opportunity of making a *post-mortem* examination on such animals if and when they are slaughtered. I

Double Intradermal Test.

No. of Cow.	Preliminary Measurement. 20/4/32.	Character of Swelling. 22/4/32.	Measurement. 22/4/32	Character of Swelling. 23/4/32.	Measurement. 23/4/32
10	6	*D.H.T.	18		
9	7	do.	23		
11	7	do.	24		
18	8	†C. Hard.	12	D.H.T.	24
12	8	D.H.T.	28		
7	8	do.	18		
17	8	do.	18		
5	8	C. Hard.	10	C. Hard	12

*(D.H.T.—Diffuse. Hot. Tender.) †(=Circumscribed.)

Subcutaneous Test, April 26th and 27th, 1932.

No. of Cow.	Preliminary Temperature.	Temperature at Injection.	9th Hour.	12th Hour.	15th Hour.	18th Hour.
10	101·2	101·2	102·8	104·2	104·2	104
9	101	101	102·4	105	105·8	105
11	102	103	103·2	105·2	105·2	104
18	102	101	102	103·2	101·4	101·2
12	101	101·2	103·6	104	103·6	104·8
7	100·8	100·8	100·2	101·6	101·8	102·2
17	102·8	103·2	104	101·4	102·2	103
5	102	103	104·2	103·8	103·4	104

think it will be agreed that the results of the tuberculin tests are, to say the least of it, very discouraging for any farmer, especially during the present depression in agriculture generally, in particular the beef trade, and further it is anything but encouraging to farmers to set up either a "Grade A (tuberculin tested)" or a "Certified" herd.

Yours faithfully,
E. F. McCleery.

Public Health Department,
12, Market Buildings,
Vicar Lane,
Leeds.
May 5th, 1932.

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BOVINE TUBERCULOSIS

To the Editor of the Veterinary Record.

Sir,—I think Major Dunkin has done well, in his letter published in your issue of April 30th, to call attention to the danger of bovines excreting tubercle bacilli in sputum and I for one, cannot see how such cattle should not *ipso facto* be considered to come within the scope of the Tuberculosis Order.

It is sometimes difficult to say when a cough commences to be "chronic," but if sputum is found in front of an animal it is inconceivable that it got there without being coughed up. If, on examination of such sputum, tubercle bacilli are detected, I think one can safely say that the cough which expelled it, is either of a chronic nature or very soon would be. A word of warning is necessary here, for acid-fast organisms other than tubercle bacilli may also be found and if mistaken for tubercle may lead to unfortunate results.

I look upon it as of the greatest importance to search for sputum when examining dairy cows, and when characteristic tubercle bacilli are found in it, I do not think that one need suffer from any qualms of conscience in saying that these are "definite clinical signs of tuberculosis." Any animal excreting living tubercle bacilli in this manner must be a source of great danger to its neighbours and may also be responsible for tubercle bacilli contaminating the milk.

In the West Riding, during the year which ended on March 31st. last, members of the veterinary staff examined 528 samples of sputum taken from cattle during their inspections, and of these 193 were found to contain tubercle bacilli. In all cases the animals responsible were slaughtered under the Order and, I venture to think, rightly so. Of this number, 134 were found to be affected with "Advanced" disease as defined by the Order and the remainder, although many of them badly diseased, could only be classified as "Non-advanced."

While on the subject of tuberculosis I would take this opportunity of replying to Mr. Ritchie's criticisms of my letter which appeared in your issue of April 16th. The information I then gave on the tuberculin tests was not intended to be taken for or against either test, but merely was quoted as an interesting experience. It is of course, quite possible, as Mr. Ritchie suggests, that at least some of the six cows specially mentioned could have been infected after the tests, but from the *post-mortem* findings and their similarity to the other cases, I rather doubt it.

Yours faithfully,
D. S. Rabagliati.

Veterinary Department,
County Hall,
Wakefield.
May 4th, 1932.

RINGBONE

To the Editor of The Veterinary Record.

Sir,—Although Professor McCunn's letter (*Veterinary Record*, May 7th), contains a good deal of what Thomas Carlyle termed "melodious wind and soft sawder," I am much obliged by its illuminating information on ringbone. I still think that Professor McCunn's explanation of the apparent lameness in anchylosed pastern is a curious theory and that it is not made more acceptable by measuring the lame leg at rest, as this procedure makes no allowance for the effect of the play of the joints (fetlock, knee, elbow and shoulder) above the anchylosed pastern in function or during locomotion, in which the lame leg may be neither longer nor shorter than the sound one. If lameness arising from anchylosed pastern is solely due to the difference in length of the fore limbs there must be many other lamenesses that could be disguised by equalising the length of the limbs by appropriate shoeing. However,, if Professor McCunn will suspend his tendency to facetiousness and carry out the following experiment—recording the result in due course—our knowledge of lameness arising from anchylosed pastern and its association or not with pain will be considerably advanced. When next he meets with a case of anchylosed pastern he should measure the length of both fore legs at rest and having ascertained the excess in length of the defective limb, the shorter or sound limb should be lengthened by affixing a compensating plain shoe to the foot. Then have the horse tested by walking and trotting to see if its action is sound or still lame. Others interested should be encouraged to try this simple experiment and to record the result in your columns.

Yours faithfully,
J. Macqueen.

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IODINE FOR POULTRY

To the Editor of The Veterinary Record.

Sir,—I shall be glad if you will permit me to refer to your issue of March 12th in which was published a review by "W. L. S." of a lecture on "The Feeding of Iodine to Poultry" by Professor Johannes Schmidt, of Leipzig. Your reviewer reproduces the conclusions arrived at by Professor Schmidt but I think it would have been fairer and less misleading had he at the same time pointed out that the Professor admits in his lecture that in his experiments he worked with large doses which, in the case of very powerful preparations, not infrequently produce the opposite effects of smaller doses, and he adds that he cannot oppose the possibility that advantages (increase in appetite, increase in growth, expedition of moulting, etc.) would follow iodine feeding on optimum doses without a new series of exhaustive and thorough experiments. It may interest your readers to know that in the experiments organised by Professor Schmidt the daily doses of potassium iodide given to hens ranged from about 1½ grains to more than 60 grains. In my own experiments and practice I have never used more than one-sixth grain per head per day and something near this dosage is what is generally recommended by competent authorities.

Yours etc.,
Frank Ewart Corrie.

Pelham,
Talbot Road,
Lingfield, Surrey.
May 6th, 1932.